

HISTORY OF OPTOMETRY



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ARRINGTON

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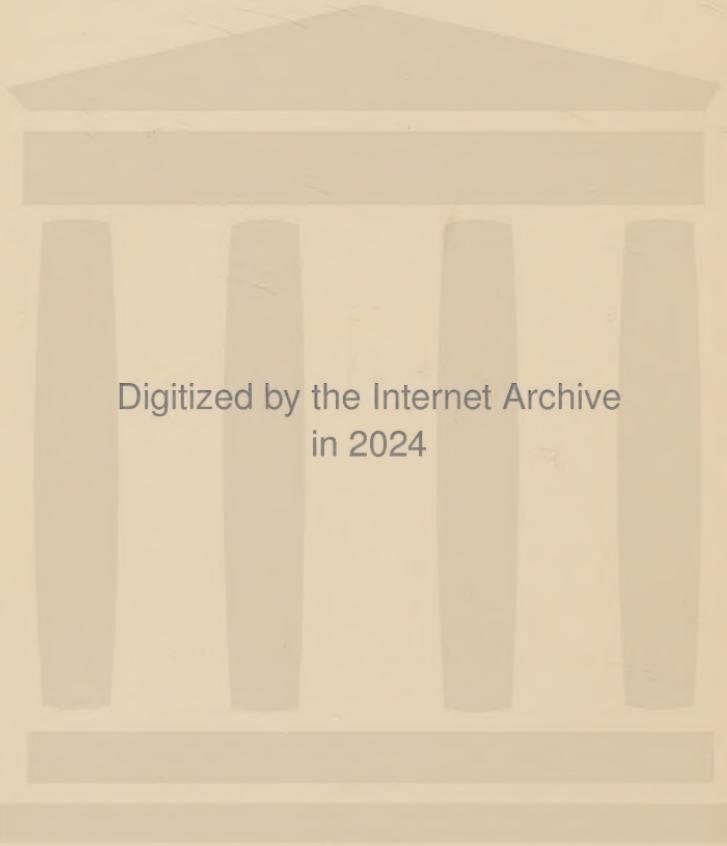
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History of Optometry

E. E. ARRINGTON

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TO
THE
PIONEERS
OF
OPTOMETRY
AND
ALL OF THOSE
WHO HAVE SINCE
KEPT THE FAITH

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PREFACE

Every profession and applied science, in addition to its scientific and technical assets, has also its *esprit de corps*, lacking which it would be a body without a soul, a dead mass of knowledge and machinery with no vital relation to human life.

Part of this vitalizing sap it draws from its tradition and inheritance,—those organic roots which ramify into the past, making contact with the processes and personalities from which it originally sprang. And part of it is the fruit of its own individual history, its struggle for existence, its experiences and reactions, its growth and organization in the teeth of those elements which resist its growth, and through their resistance develop strength and solidarity.

These are the things which breathe into a profession the breath of life, so that it becomes a living soul. These give it individuality and character, assure it a vital and honorable place among human agencies, imbue it with dignity and self-respect, motivate its progress, and fire it with enthusiasm for human service.

The traditional heritage of optometry is an open book, which he who runs may read. It is written in living characters in the life and achievements of a long line of distinguished men who established the foundations and laid the cornerstones of optical science. It is a lineage of which optometry may well be proud. No profession has any greater or more honorable ancestry. A brief survey of its high spots will be found in one of the chapters of this book, given in the hope that it will stimulate optometrists to acquaint themselves with their illustrious pedigree, and so to acquire some of the just pride in their profession which it is calculated to inspire.

The individual history of optometry, on the other hand, is a matter of comparative recency, and has never yet been written. It is not so many years ago that the very words “optometry” and “optometrist” were unknown; and the absence

of the words connoted a like absence of all that they stand for. Not so many years ago any Tom, Dick or Harry could refract and furnish glasses for the human eye, without let or hindrance; and, as a matter of fact, all sorts of conditions of men did undertake the work, with no more qualifications than a handful of trial lenses and a persuasive line of sales talk. True, even in those days there were some reputable non-medical refractionists, then known as refracting opticians; but the woods were full of irresponsible spectacle peddlers whose methods were a scandal to civilized humanity.

Today, in every State of the Union and throughout Canada the practice of optometry is a legally recognized and regulated profession of applied science; high standards of qualification and training prevail; standardized schools and colleges of optometry meet these educational requirements; several of the larger universities include a chair and a course in optometry in their curriculum; and the profession itself has an independent and equal standing with the other learned professions.

What has taken place in the intervening years, to bring about this gratifying state of affairs? Who and what have been responsible for the face-about in the situation, of such inestimable benefit to humanity? The answer constitutes the inspiring history of optometry, which has never yet been told, and which it is the purpose of this book here for the first time to tell. It is, indeed, time that the profession and the public heard the dramatic and soul-stirring story, that the documents in the case were laid before them, that they learned on what sound premises, through what persistent effort, optometry has been established, by what tireless, dogged, inch-by-inch fighting its rights in the premises were wrested and its position finally won.

It is not to be supposed that the battle was won and the victory achieved without opposition, and even bitter opposition. And it was only natural that the sinew of the opposition should come from the medical profession. Now that the fight is over, and won, there is neither reason nor disposition,—certainly not upon the part of those who took actual part in the struggle,—to reflect upon, or even to impute, class or personal animosities. Like most wars, it was an inevitable bi-

ologic conflict, for which no individual or individuals can, in the large sense, be held accountable.

For more than a century, such professional title as did pertain to the field of ocular refraction had been the exclusive prerogative of medicine. In all those years, to be sure, medicine had never been able to make good her title to the extent of barring others from the premises, as she had very properly succeeded in doing in respect to the diagnosis and treatment of disease,—for the good and sufficient reason that her title in this particular premise was a spurious one. And, in consequence, medicine had been helpless, and at last seemingly indifferent, to stem the abuse of the irresponsible and unscrupulous spectacle peddler. Still, she held the title by courtesy, for what it was worth, and had come, through what the lawyers call "undisturbed possession," to regard the refraction of the eye as an integral part of her domain.

It was therefore natural that when optometry entered a prior claim to the territory, and proceeded to set about to establish it, medicine should vigorously resent and resist the innovation. It was, in fact, as stated, an inevitable biological reaction. That this was the nature and character of the resistance is evidenced by the fact that the opposition came, not from the rank and file of the medical profession, who were not economically interested in the issue, but from a relatively small group of specialists of whose practice refraction formed an important item. And not from all of these. To their everlasting credit and honor be it said that there were not a few fair-minded and far-seeing physicians, including oculists, who recognized the truth and justice of optometry's claims, and who not only did not oppose, but actively lent their influence and aid to the passage of optometry laws. These men optometry will ever hold in grateful esteem, and the march of events, as embodied in this history, will give them much silent satisfaction, in the vindication of those basic facts and principles to which they gave their faith and support.

The story of such opposition is not a new one. Medicine herself encountered it, centuries ago, from the church, whose function she properly invaded and usurped. Much more recently, dentistry met the same resistance from medicine to its

efforts to establish itself as a separate profession. Dentistry's struggle for place, indeed, almost parallels that of optometry, with, however, two notable differences: First, at the later period of optometry's development medicine was much more powerfully organized, so that the opposition was considerably more systematized and implacable than that which dentistry encountered. Second, whereas dentistry was, in point of fact, a branch of the medical family, optometry's paramount claim was that it had no relation whatever to medicine, but was an applied arm of the science of optics, wholly separate and distinct from medicine in its lineage, its content, and its practice. This latter fact made optometry's task at once simpler and cleaner-cut, and at the same time aroused more vigorous antagonism on the part of medicine.

The soundness and reasonableness of optometry's claim have been conclusively settled by its overwhelming endorsement in every State of this country and every province of Canada, over every argument and fact and influence that could be marshalled against it. And the result of the enactment of optometry laws is universally conceded to have redounded to increased human efficiency and the conservation of human vision.

The making good of its contention, and the establishment of its position as an independent profession, in the teeth of this opposition, although unquestionably the most strenuous part of optometry's task, was by no means the whole of it. Although the story of the long, unremitting, indomitable fight for recognition, carried into the legislative halls and the executive mansions of this country and Canada, is the most dramatic and stirring chapter of its history, it is not the entire history.

Relentless and bitter as the opposition was, it was not without its salutary uses. It undoubtedly served to spur optometry to the building of its own fences and the development of its internal resources. Like Nehemiah's men of old, its builders carried a sword in one hand and a trowel in the other. And the erection of its educational structures, while it may not make quite such spectacular reading as the story of its legislative battles, forms a no less important part of its history. It is doubtful if any other profession or applied science,

in the same length of time, ever created and brought to the same degree of efficiency such an educational organization as that which optometry boasts today.

It is the hope and belief of broad-minded, intelligent men in both camps that the day is not far distant when optometry and medicine will cooperate together, side by side, for the common welfare of humanity. Such friendly and effective co-operation, however, can come about only by the frank and fearless assertion of the independence of the two professions and their respective fields. Two cannot walk together unless they be agreed; and there can be no agreement except between independent equals, for agreement rests upon self and mutual respect. Neither medicine nor the public can respect optometry as a camp-follower of medicine; nor can optometry respect herself in any such subservient role.

It is the purpose of this history to spread upon the record, once for all, the facts and evidence in the case, the incontestable logic, both of reason and of events, by which optometry has established her declaration of independence and her place in human service, the uncompromising victories she won all along the line, and her final entrenchment in undisputed possession of the premises. Optometry stands squarely upon her own feet, with a lineage, a field of action, and a professional status distinctively her own, the equal of medicine, dentistry and law, affirmed and ratified "of record." And here, in these pages, is the record, inviolate, incontrovertible, in which the profession of optometry, and every individual member thereof, may proudly find the pledge of their birthright.

To make mention of all the names and incidents associated with the enactment of optometry laws and the development of the profession would fill ten thousand pages, and then the half would not be given. No attempt is made, therefore, in this direction, for fear of omitting some,—especially among the many loyal members of State legislatures and State executives, whose support made possible the State protection of human vision.

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CHAPTER I

Optometry's Early History

Professional prestige does not spring up, mushroom-like, over night. It has its root away back in history and tradition, and must give some worth-while account of itself. To command respect and privilege, it must have more than a mushroom origin; it must show an ancient and honorable lineage in some worth-while research and achievement.

Spectacles were undoubtedly made and worn long before the Christian era. There is probably truth in the tradition that a Chinese mandarin, whose very name is lost in oblivion, centuries before Christ, happening to gaze through a piece of surfaced glass, found that he could read better with its aid,—tried reading without it, then with it again, and confirmed his first impression, without in the least knowing how or why, and thus foreshadowed the invention of presbyopic glasses. Another tradition, also probably authentic, credits the Roman emperor Nero with watching his gladiators through a concave emerald,—a similar foreshadowing of myopic lenses.

In the middle of the thirteenth century Roger Bacon, the English philosopher and man of science, dabbled somewhat in optics, although careful research has shown that very little can with accuracy be ascribed to him. His actual contributions have probably been greatly exaggerated. He describes in his writings a method of constructing a telescope, but not so as to lead one to conclude that he ever possessed such an instrument. Burning-glasses were in common use, and it does not appear that he made spectacles, although he was probably acquainted with the principle of their construction. His day was the day of theoretical rather than constructive knowledge.

It was in the seventeenth century that modern optics, the progenitor of optometry, had its real beginning, with the discovery by Willebrord Snell, a Dutch astronomer and mathematician, of the law of refraction of light. It was in 1621 that he discovered and enunciated his famous law that "the ratio of the sines of the angle of incidence and the angle of refraction is constant;" but it was not published until ten years after his death, in a work by Rene Descartes, without any reference to Snell's name. Whether Descartes had access to Snell's manuscript, or made the same discovery on his own account, is a disputed question.

Snell's original manuscript, by the way, did not state the law in the form in which we now state it. He expressed it as the ratio of certain lines trigonometrically interpretable as sines of cosecants. Descartes expressed the law in its modern trigonometrical form, viz., as the ratio of the sines of the two angles.

Descartes himself developed a theory of light which in some respects approximated the modern wave theory. He regarded light as a pressure, transmitted by an infinitely elastic medium, and color as due to rotary movements of the particles of this medium,—a rather interesting theory in the light of present-day conceptions of the electromagnetic nature of light.

In 1676, Ole Roemer, a Danish astronomer, deduced the velocity of light from a comparison between computed and observed times of the eclipse of Jupiter's moons. He calculated this velocity as 186,000 miles per second in luminous ether; and while Michelson, of Chicago, has recently corrected it by a slight figure, it must be admitted that Roemer's calculation has, in the main, stood the test of time.

In 1678, Christiaan Huygens, a Dutch physicist, enunciated his famous theory of the undulatory nature of light, upon which all of our modern science and art of refraction are based. For many years this theory was overshadowed by the corpuscular theory of Newton, due wholly to the tremendous authority of the English mathematician. It was not until the nineteenth century that the Newtonian theory was finally over-

thrown by J. B. L. Foucault, who showed that the velocity of light was less in water than in air.

These were the colossal figures of that century who laid the foundations of modern optical science, and started the train of scientific events which ultimately gave birth to optometry.

While these men were spinning their scientific theories, others in the same and other countries were working out the practical side of optics, inventing and constructing marvelous optical instruments which enabled men to see mountains on the moon and millions of animals in a drop of water,—the telescope, the microscope, the stereoscope, the photographic camera, and other instruments which opened up new worlds to astonished eyes.

In 1757 John Dollond, an English optician, originally a silk weaver of Spitalfields, London, first succeeded in making an achromatic lens, by a combination of glass and water media, and later accomplished the same end by combining different densities and qualities of glass. In 1784 our own Benjamin Franklin took a hand in practical optics, and it was his shrewd brain that invented the bi-focal lens.

Lastly, there was a group of scientific men, in the latter part of the eighteenth and the early part of the nineteenth centuries, who perceived that the human eye was a finely constructed optical instrument, and set about to apply the principles of optics, as worked out by those others, to the mechanism of the eye. These men and their co-workers built up a distinctive branch of optical science, known as "physiological optics," by which the whole subject of human vision became one of the most exact knowledge and practice. Among this group three names stand out so far above all the rest that they may be mentioned without risk of rivalry: Helmholtz, Young, and Donders.

Hermann Ludwig Ferdinand von Helmholtz, the German physicist and physiologist, was born at Potsdam, Prussia, on August 31st, 1821. Beside being the inventor of the ophthalmoscope and the ophthalmometer, he made invaluable con-

tributions to the field of physiologic optics, notably his demonstration of the function of accommodation, and the formulation of a theory of its mechanism which dominates the teaching of the present day.

Thomas Young, English physicist, was born at Milverton, Somersetshire, in 1773. He anticipated Helmholtz by several years in a general explanation of accommodation, and originated the theory of color perception which Helmholtz afterward developed. He was, moreover, the discoverer of the phenomenon of interference of light waves.

Franz Cornelius Donders, Dutch physician, was born in 1818 at Tilburg, Holland. In his capacity as Professor of Physiology, Histology and Ophthalmology at the University of Utrecht, he did important work in ocular refraction. He may, indeed, well be called the father of modern ocular refraction.

All of this development was the outcome of studies and labor in that branch of physical science which dealt with light and optics. It is true that a few—a very few—of the men engaged in the work were graduates in, and some of them even practitioners of, medicine; but it was as physicists, and later as physiologists, not as physicians, that they prosecuted these studies. And it was sheerly by the knowledge and application of optical principles that they developed the applied science of measuring the optical defects of the human eye.

For some reason or other,—probably because the human eye is a part of the human body, which the medical man had long been accustomed to look upon as his professional concern,—the practice of ocular refraction was assumed by the medical profession, or, more correctly, by the oculists, although it had nothing whatever to do with diseases of the eye. On the other hand, the jeweler took up refraction, not because his qualifications had anything to do with the eye, but because his craft dealt with the manufacture of the precious metal fittings used in spectacles and eyeglasses.

Toward the end of the nineteenth century, however, there arose a group of men among the optical scientists themselves,

who perceived that ocular refraction was really a human-service arm of optical science; that it belonged in the same category with the telescope, the microscope, the photographic camera, and all the other aids to vision whose working principles were part and parcel of the science of optics; and that the proper men to deal with it were the men who came up through that science and were allied with it.

The thing to do was to recognize and legalize a profession, composed of these men, to do ocular refraction, who should be specially educated and trained in physical and physiological optics. To this end legislation was sought and finally obtained, and institutions of higher learning, such as the State universities and other educational bodies, have established regularly accredited scientific courses in these subjects.

This, then, is the history, in brief, of the profession of optometry, from the standpoint of tradition and inheritance. Optometry is not the practice of medicine, in any of its branches, or any spurious imitation of it. It did not spring from medicine, nor is it allied with its history or traditions. It has a long and honorable ancestry of its own. It traces its heritage, not through Harvey, Laennec, Corvisart, Boerhaave, and Paracelsus, to Galen and Hippocrates, but through Young, Helmholtz, Gauss, Newton, Descartes, Huygens, down to Aristotle. Its lineage does not lie through pathology and pharmacology, but through physics, mathematics and optics.

Optometry is, in short, by its tradition and development, a specialty in optical science, in that branch of it known as physiologic optics, giving optical service for the aid of vision in the healthy eye, to which it brings all the scientific and mechanical resources which its alliance with this long heritage of optical science gives it. It has a distinctive and honorable prestige, in a branch of applied science all its own, where it is without a rival, in which the optometrist is as justly esteemed as the dentist in dentistry, the chemist in chemistry, or the lawyer in law.

It is worthy of note, in conclusion, that since ocular refraction has been in the hands of specialists in optical science

it has made enormous strides forward. All sorts of improved methods and instruments have been devised, based on sound optical principles, and worked out with great technical ingenuity, to the great advancement of optometry and the betterment of the human race. At least two important and basic contributions have been made within recent years to optical principles, as related to ocular refraction, of which mention will be found in another chapter. And both of these contributions came from optometrists.

CHAPTER II

Optometry's Legislative Efforts

Optometry's primary task was a legislative one; to define its nature and scope; to establish its rights in the premises; and to obtain the legal recognition and certification, in the shape of State practice acts, which would insure it those rights and safeguard the public against irresponsible, unqualified practitioners.

All of this optometry was obliged to do from the ground up, with no precedents to support it, and in the face of long-entrenched presumption against its claims. It had to convince the legislators, by fact and argument, of the distinctive nature of ocular refraction, and the logical title of the optometrist, both by traditional heritage and by individual qualification, to perform that service. And it had to break down the opposition of the medical profession, who for almost a century had held presumptive title to the field, and were naturally unwilling to see it pass out of their hands.

But, preliminary to either of these tasks, it was necessary to "show cause" for legislating on the subject at all. It was not to be expected that legislatures would consider laws, far less enact them, for the sheer purpose of creating a restricted profession for the benefit of any group of men. There must be a public need and reason; either in the prevalence of existing abuses which the law was designed to remedy, or in manifest advantages to the public which it was calculated to bring about, or in both.

In this respect the task was relatively simple. The abuses were there,—so obvious, so widespread, and so bad, that all that had to be done was to point to them. Not even the medical profession could, or did, seriously deny their existence or

belittle the need for their abatement. There were absolutely no restrictions or checks whatever on the practice of refracting, or pretending to refract, the eyes of the people, and selling them glasses. Thousands of eyes were being ruined yearly by the brazen charlatany of unscrupulous spectacle peddlers and eye quacks, who did not even make any pretensions to training or qualification, but whose only object was to squeeze out of the business and its victims all that the traffic would stand, impudently confident in the helplessness of the law to hinder them. There was, in fact, no way of stopping them, and they were growing more numerous and more impudent every year.

If medicine had ever tried to put an end to the unrestrained abuse, she had signally failed to do it. For such failure, to be sure, she could not, in the larger sense, be held accountable. The only way to end it was to preempt the field, and to exclude all others from it. And the truth is, of course, that medicine had never been able to make an issue of her assumed right and title to the practice of refraction, as she had done in the case of the diagnosis and treatment of disease.

To this deplorable situation now came optometry, and proposed to remedy it by restriction of the work, through legislation, to a scientific profession, defined as to its functions, certified as to its qualifications, and licensed in its practice. It proposed the creation of no new profession; for it claimed that in its own person the profession in question already existed, and it offered to establish its natural and inalienable rights in, and succession to, this field of service, both historical and technical.

Here is where medicine joined issue. She denied optometry's claim to the title, insisted that the refraction of the eye was an integral part of the practice of medicine, and vigorously opposed its being delegated to any one else than members of the medical profession. All of which laid upon optometry the burden of proving that ocular refraction was not, never had been, and never could be, a part of medicine; that it was wholly and purely an applied arm of optical science;

that it traced its development and lineage, not through medicine or medical men, but through physics and optics, and their exponents.

By what facts and arguments optometry established its position; the answers it made to medicine's claims; the reactions it aroused and the support it received, from the public press and even from a portion of the medical press; and later, after legislation had been put into force, the testimony of public officials to the beneficial results which flowed from its operation; these and other associated phases of the struggle are set forth at length, with documentary evidence, in chapters devoted to them. What we are here concerned with is the struggle itself.

It happened that the earliest legislative battles were staged in the State of New York, due largely to the fact that the early organization and personnel of optometry's forces were centralized in that State. It was deemed wise to concentrate effort upon one legislature,—to present there the whole case, which, being won, would then serve as a precedent and model for the other States. It turned out, however, that owing to the strength of the medical opposition in that highly-organized State, New York was not the first to obtain the enactment of an optometry law.

Preliminary work was begun in New York State about the year 1900. An important item was the drafting of a law which would hold water, for which the services of an expert attorney were engaged. Yet New York pioneer optometrists did not at first succeed in obtaining legislation. In 1901 Minnesota first succeeded in putting a similar optometry practice act upon its statute books, followed in 1903 by California and North Dakota. In 1905 New Mexico and Oregon followed suit. These five States were fortunate in encountering comparatively slight opposition from the medical profession, whose organization in the States in question was not strong.

In 1904 a reorganized and strengthened New York State Optical Association put the full weight of its influence and aid behind an unremitting legislative campaign, which met de-

feat for four consecutive years, and finally achieved success in 1908. But during these intervening years seven other States succeeded in securing optometry laws, so that in 1908 the New York State optometry law was the thirteenth. In 1909 eleven other laws were enacted, making a total of twenty-four. From then on, it appears to have been a somewhat long-drawn-out succession of one or two States each year, with the exceptions of 1910, in which year there were none, and 1919, when four States joined the list.

The last American State to obtain a law was the District of Columbia, in 1924. Within the intervening years all the Canadian provinces also secured optometry practice acts, and similar laws are now operative in all outlying American possessions and in some of the provinces of Australia.

The length of time covered by this campaign, from 1900 to 1924, is not only indicative of the tempestuous seas which optometry was forced to navigate, but also gives eloquent testimony to the aggressiveness and perseverance of those who piloted the good ship Optometry into its desired haven. These men are known and revered, not only in their own States, but enjoy affection and approbation throughout our own and sister nations. It is impossible even to name them all in this limited history, which must confine itself to a brief narration of the chief incidents and obstacles of the stormy course they successfully made, and the successes that crowned their efforts.

The story was substantially the same in each instance, differing only in the degree of opposition encountered. Indeed, the battles in the different States can hardly be considered as separate or isolated struggles, except in the sense that the leaders in each State bore the brunt of that State's conflict. Rather, they were simultaneous or successive engagements in one great national campaign; especially from 1910 on, at which time the American Optical Association threw its national influence and assistance into the nation-wide fight for legislation. And the fact that one State secured its legislation earlier or later than another must not be indiscriminately laid to more or less energetic effort in one State than in an-

other, but was more often a matter of opportunity, strategy, opposition, and what not. It was no uncommon thing for the optometrists of a State to put its bill successfully through both houses of legislature, only to have it vetoed by an unfriendly executive; in which event, of course, it was necessary to wait until another Governor should occupy the chair before a new effort was undertaken.

The opposition in every instance came from the same quarter,—from the oculist contingent of the medical profession, exercised through medical organizations and the State medical boards. And the nature of the arguments advanced against optometric legislation was in each case likewise the same. These objections have already been referred to in general terms. They may be categorically summarized as follows:

1. Ocular refraction and its associated procedures are, *a priori*, an integral part of the practice of medicine. The eye being a living organ of the body, and vision a vital function, it is naturally and exclusively the province of medicine and the medical man to deal with visual defects.

2. To legalize a profession of optometry would open the way to a class of men untrained in medical science to "enter the practice of medicine by a back door," or at least create a false impression among the public that optometrists are competent to treat disease.

3. The one or two year training in optics required for the optometrist, as against the four or five years training of the medical man, the latter including the pathology and therapeutics of the eye, does not justify delegating the practice of refraction to the former.

4. Proper and efficient refraction of the eye cannot be performed, in many cases, without the use of "eye drops," to relax the ciliary muscle of the eye,—from which the non-medical optometrist is prohibited by law. (One Governor, at least, vetoed an optometry bill on this ground.)

5. Many eyes that suffer from defective vision are the subjects of disease, and to be refracted by a non-medical man

is to run the risk of having some pathological condition of the eyes overlooked. The optometrist is not competent to recognize disease, and therefore should not be allowed to undertake the correction of visual defects, which might be the manifestation of disease.

6. To create a non-medical profession of optometrists would produce confusion in the public mind and lead to quackery and abuses in a matter affecting the health and safety of the people.

To these arguments and objections optometry made equally categorical rejoinders, as follows:

1. Ocular refraction is not, and never has been, a part of medicine, either by inheritance, basic principles, development, or practice. It is an applied arm of optical science, resting upon the work and discoveries of physicists and opticians through the ages, down to modern times. It does not treat the eye, whether in health or disease, but adapts the light waves which enter the eye, in accordance with optical principles, so as to produce focused and single vision with the least abnormal exertion on the part of the eye. And, finally, its distinction from and independence of medicine have been affirmed by supreme court decisions in every case in which the question has been brought up for adjudication.

2. Since refraction is thus determined, by all criteria, to be not a part of medicine, and all that optometrists are seeking is the regulation of this non-medical practice, there can be no question of "entering medicine by the back door," or of creating a false impression among the public. What optometry seeks is to rightfully enter its own legitimate profession by the front door, and to be enabled to render the public competent service in that field.

3. While it is true that the medical student undergoes four or five years of educational training, practically none of this curriculum is devoted to the fundamentals of optics, only a few hours to the eye, and, not one hour to the study and practice of ocular refraction. That this is utterly inadequate to fit him for refractive work is evidenced by the fact that the oculist himself

regards the general graduate in medicine as unqualified for this work. On the other hand, the entire two or more years of the optometrist's course, and in some cases increased to three and four years, are now devoted to intensive training in optical science and ocular refraction. The true ratio is obvious.

4. Whatever may be the limitations of the medical refractionist, optometry asserts that by means of methods devised and perfected by optical technicians it is possible, not only to measure the refraction of the eye correctly without the use of "eye-drops," but to do so with the ciliary muscle of the eye in active contraction. It further asserts that the routine use of "drops" in the eye, for the purposes of refraction, is a dangerous proceeding, whether by a layman or a doctor, and offers testimony to that effect from established medical authorities themselves.

5. There is no question of creating a new non-medical profession, but of recognizing and regulating an already existing profession to which, by all considerations, the work of ocular refraction rightfully belongs. So far from such a step creating confusion and abuses, the confusion and abuses already prevail, to the great menace of the public welfare and human efficiency, and it is for the remedy of this disastrous state of affairs that optometric legislation is sought.

It might well seem to the unsophisticated mind that the issue, as presented in these arguments and their rejoinders, is so plain and straightforward that it has only to be stated to be recognized and allowed. So one might think of the issue involved in any war,—when it is over and the smoke has cleared away. The real struggle is not between reason and reason, but between reason and prejudice, plus entrenched privilege. And that is a hard, long conflict.

However, reason and right did at last prevail all along the line, as they always do if their proponents stick to their guns long enough. One by one, legislatures and executives were won over to the reasonableness of optometry's position, and to the genuineness of the need for the legislation sought, until at last optometry's flag was nailed to the masthead of every

State capitol in the United States, and every governmental post in Canada.

With keen discernment and clear phraseology, Governor Charles E. Hughes, of New York, when he affixed his official signature to the optometry bill of that State, thus making it law, summed up the equity and the common sense of the whole situation in a few trenchant words.

“Objections have been urged,” said Governor Hughes, “to giving legal recognition to the practice in question; but the fact remains that the practice exists, and will continue, and unquestionably it forms a proper subject for regulation. I therefore approve the bill.”

A record of the enactment of these laws by the various States, in alphabetical order, with the names of the Governors who approved them, is as follows:

States	Law Passed	Governors
Alabama	1919	J. H. Bankhead
Alaska	1917	J. E. A. Strong
Arizona	1907	J. H. Kibbey
Arkansas	1915	Geo. W. Hays
California	1903	Geo. C. Pardee
Colorado	1913	E. M. Ammons
Connecticut	1913	S. E. Baldwin
Delaware	1909	S. S. Pennewill
Dist. of Columbia	1924	Pres. Calvin Coolidge
Florida	1909	A. W. Gilchrist
Georgia	1916	N. E. Harris
Hawaii	1917	Lucius E. Pinkham
Idaho	1907	F. R. Gooding
Illinois	1919	Frank O. Lowden
Indiana	1907	J. Frank Hanley
Iowa	1909	B. F. Carroll
Kansas	1909	W. R. Stubbs
Kentucky	1920	Edwin F. Morrow
Louisiana	1918	R. G. Pleasant
Maine	1909	B. M. Fernald

States	Law Passed	Governors
Maryland	1914	P. L. Goldsborough
Massachusetts	1912	Eugene Foss
Michigan	1909	Fred M. Warner
Minnesota	1901	S. A. Van Sant
Mississippi	1920	Lee M. Russell
Missouri	1921	Arthur M. Hyde
Montana	1907	Jos. K. Toole
Nebraska	1907	Geo. L. Sheldon
Nevada	1913	W. W. Kitchin
New Hampshire	1911	Robt. P. Bass
New Jersey	1914	J. F. Fielder
New Mexico	1905	M. A. Otero
New York	1908	Chas. E. Hughes
North Carolina	1909	Tasker L. Oddie
North Dakota	1903	Frank White
Ohio	1919	J. M. Cox
Oklahoma	1911	Lee Curce
Oregon	1905	G. E. Chamberlain
Pennsylvania	1917	M. G. Brumbaugh
Rhode Island	1909	A. J. Pothier
South Carolina	1917	R. I. Manning
South Dakota	1913	Frank M. Byrne
Tennessee	1907	M. R. Patterson
Texas	1921	Pat. M. Neff
Utah	1907	John E. Cuttler
Vermont	1909	Geo. R. Prouty
Virginia	1916	H. C. Stuart
Washington	1909	M. E. Hay
West Virginia	1909	W. E. Glasscock
Wisconsin	1915	E. L. Philipp
Wyoming	1917	J. B. Kendrick

CHAPTER III

Optometry's Objections—Answers

Medicine's first demurrer to the claims of optometry was the sweeping assertion that ocular refraction was in itself an integral part of the practice of medicine. The eye, said the medical objector, was an organ of the human body; vision was a body function; defects of vision, their determination, measurement and correction, were therefore clearly a medical province.

To this assertion optometry filed both a general and a particular answer. For its general answer it pointed to the historical record of the development of optical science and applied optics, including the invention of lenses and optical instruments and their adaptation to human vision, as set forth in a previous chapter,—utterly separate and distinct from the history and development of medicine, based upon wholly different premises and dealing with totally different phenomena.

For its particular answer optometry brought convincing evidence to show: (1) That ocular refraction, while it was concerned with the vision of the human eye, dealt with it sheerly as an optical system; that errors of refraction were not ocular diseases, but optical defects, requiring optical detection, measurement and correction. (2) That, by the same token, lenses and prisms, by which refractive errors were determined and corrected, were not medicinal agents; they did not act directly upon the eye, to alter its physical structure or condition, but upon the light-waves, before they entered the eye, to make them conform to the optical conditions of the eye, or to enable the eye to adapt its optical conditions

to the light-waves for the obtaining of clear and easy vision. (3) That the efficient performance of this service called, not for medical knowledge and skill, but for education and training in applied optical science, to which little or no place was given in medical curricula; that, therefore, the medical man, as such, was not adequately qualified to practice refraction, unless and until he stepped aside from his medical role and became, for that purpose, a student and practitioner of optics.

The fundamental distinction between medicine and optometry was ably set forth in an editorial which appeared in the March 1910 issue of *The National Jeweler and Optician*, under the title "Basic Differences between Medicine and Optometry." This editorial is such a clean-cut, comprehensive statement of the case that it is quoted here in full.

"One would suppose that the vexed question of the alleged identity between optometry and medicine, urged from the beginning by our medical friends, had by this time been thoroughly disposed of; but apparently it has only been scotched for it continues to show signs of perennial vitality by bobbing up here and there as though it were still an issue; and, what is more remarkable, the representatives and advocates of optometry continue to temporize with it, as though it were an issue that demanded compromise instead of decided and radical and unconditional denial. Nothing is, to our mind, more weakening to the cause of optometry than the hesitating, superficial way in which its defenders meet this assertion of the medical profession, allowing themselves to be led into heated and sometimes personal disputes concerning unimportant details and side issues, and missing the real arguments which lie at the heart of the matter. It is this consideration which moves us, even at the risk of repeating ourselves, to set forth again, here and now, as we have more than once set forth in the past, what we believe to be the basic differences between medicine and optometry.

"It is a well recognized truth that the entire outworking of civilized life resolves itself in the last analysis into a maintenance of the adjustment between a man's body and its environment, accomplished as far as possible from the outside, i.e., preparing the things which the body is to utilize in the shape in which the body can best appropriate them. Thus, the body needs food, and this is prepared for it in palatable and digestible forms by cooks. It needs certain degrees of warmth and ventilation, which are provided by the engineer. It requires to be transported more rapidly and further than its own motor facilities

will permit, and such transportation is furnished it by car builders and engine drivers and others. So long as these external adjustments are adequate for the body's needs, it remains in health. When, in spite of these numerous ministrations, the body falls short of its own proper functions, then there arises the necessity for quite another class of ministrants, who give exclusive attention to the mechanism of the body itself, and these constitute the medical profession.

"No one wishes to dispute with the doctor this distinctive province of dealing with and adjusting the mechanism of the body. Certainly the optometrist has no such desires. On the contrary, the basic distinction between optometry and medicine is that the former belongs to that class of service which concerns itself with the adjusting of environment to the body, while the latter is concerned with adjusting the body to its environment. The optometrist does not undertake to do for the eye anything essentially different from that which the cook does for the stomach, the engineer for the vaso-motor nerves, or the railroad man for the legs. All that the optometrist proposes to do is to adjust rays of light, before they enter the eye, to the best possible utilization of them by the eye. He belongs to a fundamentally different class of ministrants from the doctor.

"It is true that the optometrist is required to know something of the physiology of the eye, just as the scientific cook needs to know something of the digestive function, the engineer of the physiology of body heat, and so on. But to assert that the optometrist therefore must have a general medical education, or that his work is an integral part of the practice of medicine, is just as absurd as to make the same assertion about a cook or an engineer. Indeed, upon the same kind of reasoning, everybody who is engaged in any industry that has for its ultimate end the adaptation of any article or material to the use of the human body should have a general medical education. The tailor, who clothes the body; the shoemaker, who shoes the feet; every manufacturer who prepares articles of consumption for the human stomach; even the lawyers and clergymen who enter into psychological relations with their clients and parishioners; all of these, upon the showing made in respect to optometry, should possess a general knowledge of medicine and surgery before being allowed to ply their respective callings.

"It is true also, as we have been pointing out in these pages for the past few months, that in the practical outworking of the profession of optometry it necessarily overlaps the practice of medicine at certain points. That is inevitable and unavoidable; and, once again, this condition is not peculiar to optometry, but inheres in every industry and service which pertains to the human body. No sensible reasonable man haggles over such incidentals as these. The central truth is, that

optometry does not treat the eye, as an organ, but confines itself to a treatment of rays of light before they enter the eye, just as the engineer deals with heat rays before they enter the body, and in this function optometry is radically and fundamentally distinct from medicine, which concerns itself with the actual mechanism of the body itself."

The concrete points in the argument were tersely summarized in a pamphlet issued and distributed during the legislative campaign by the American Optical Association, at that time the national organization of the optometrists:

- "Physics is not physic.
- "A lens is not a pill.
- "A lens treats light.
- "A lens does not treat disease.
- "Optometry is not a medical science.
- "Optometry is founded upon optical science.*
- "Optics are not taught in medical schools.
- "Optics is not mentioned in medical statutes.
- "The practice of optometry is specifically excluded from the provisions of the State medical laws."

In an address before the New York Assembly on Public Health, on March 5th, 1907, Dr. A. Jay Cross epitomized the situation in brief, simple language, as follows:

"Optically speaking, the eye is like a camera, because it possesses both a light-bending and a light-registering apparatus. In a camera the light-registering plate, or focal screen, is chemically sensitized. In an eye the light-registering plate, or focal screen, is nervously sensitized, thereby communicating impressions made by waves of light to the brain, in a similar manner to the action of the sensory nerves of the skin in communicating a touch of the hand to the brain.

"An eye can be born imperfectly shaped, as well as a nose or an ear can, and still be considered as a healthy organ free from disease. The eye, like a camera, in order to do good work must have its light-bending and light-registering apparatus in perfect adjustment to each other. If an eye, for instance, is not deep enough from front to back then an adjust-

*At the time this pamphlet was issued optometry had already been legalized in some of the States, including New York, and optics and optometry were both being taught in the department of physics at Columbia University.

ment that is not normal must be maintained through an excessive exertion of the small muscles governing focal power, these muscles being attached by means of a suspensory ligament to the capsule of the jelly-like crystalline lens. The excess exertion required to keep up this visual adjustment constitutes what is known as 'eye-strain,' because tension on the eye muscles can produce fatigue, and its train of headaches and other nervous reflexes, the same as fatigue of leg muscles can produce its nervous reflexes.

"In one case a pair of glasses serves to bend the rays of light before they enter the imperfectly formed eye and thus enable it to perform its visual function without excess effort.

"In the case of over taxed leg muscles a cane, a crutch or a chair performs a similar service, and therefore these aids belong under the same classification as that given spectacles and eye-glasses and all other external devices used for the conservation of nervous energy.

"From the time of the invention of spectacles, 1299 A. D., up to about the year 1850, with a very few exceptions nearly all discoveries in the science of optics were made by astronomers and opticians. At this time observing physicians noted that the wearing of glasses did more than just aid the eye-sight, and in the closing years of the last century the term 'eye-strain,' in place of eye-muscle-fatigue, was created, and those who formerly paid attention to diseases of the eye annexed the work of the optician to their practice and began to fit glasses.

"Ten years ago those opticians who had kept up to the times asked the legislature of the State of New York to pass an educational bill requiring the board of regents to appoint a board of examiners in optometry, or scientific eye measuring as the term implies, in order that the standards of competency in this work could be advanced, so that the eyes of school children might secure intelligent optical care without incurring too great an expense.

"Much to the surprise of those interested in this bill the State Medical Association opposed it on the ground that if glasses relieved headaches then they must, per force, be medicine. Optometrists replied that if the practice of optometry is the practice of medicine then why don't medical colleges teach it? and the reply is made that the study of medicine so trains the mind that a graduate can acquire a grasp of another subject, such as optometry, quicker than an optician can.

"For a number of years poisonous drugs were used to prepare a healthy eye for optical measurement. At this time, however, it is known that more perfect results can be achieved without the use of these, so called, 'drops' than with them.

"Another argument put forward is that diseases of the eye can only be recognized by an oculist. If the word 'differentiated' is substituted for the word 'recognized' then this contention is unquestionably true, but any

layman can recognize a pimple on a friend's nose, even if he does not know its significance, and optometrists contend that an intelligent optician is less liable to pass over a case needing medical treatment than an unintelligent one, besides, this is an age of improved instruments for the determination of disease, where is the harm, then, in finding diseased tissue with a microscope provided laymen do not treat the disease so found?

"It is estimated that ninety per cent. of the practice of the average oculist comes from an examination of eyes with a view to the fitting of glasses, so if an optometry bill was strictly fair it would require that medical men who do this work be required to pass as stringent examinations as opticians do. The answer is made that this would attack the integrity of a medical diploma. So we have the old, old story of the 'dog in the manger.' The great middle-class in this State who can not, or will not, go to a charitable eye-hospital to be practiced upon by incompetent post-graduate students must either remain partially blind or pay medical fees for mechanical work."

An astronomer, it was pointed out, does not get a medical prescription when he installs a new telescope in his observatory. A navigator does not ask for medical advice when he selects his marine glasses. A chemist does not ask medical permission when he purchases a polariscope for his technical work. A microscopist seeks no medical counsel in choosing a microscope suited to his requirements. And there is no more ground for the interposition of medical principles or medical practice in the adaptation of ocular lenses to human vision.

"The human eye," to quote from another pamphlet issued by the American Optical Association, "has a lens system of its own which, under normal conditions, can change its focus at will, wherever the vision is directed, either near or far. In the abnormal eye this range of focus is more or less limited. In the case of myopia (near-sightedness) distant vision is not clear because this kind of eye is able to focus for short distances only. In hyperopia (long-sightedness) the eye is better adapted for distant vision than it is for near at hand. Astigmatism is a condition of irregular focus wherein the sight is not entirely clear at any point. To any thinking persons it must therefore be perfectly plain that these irregularities of focus are not forms of disease, but simply faulty alignments in the mechanical make-up of a healthy eye.

"Any of these defective conditions may be exactly measured, and a lens placed before the eye which will give standard vision, and this, too, without the use of any drugs of any kind whatsoever. This work of measuring the eye, with a view to discovering mechanical inaccuracies that may impair vision and cause strain, and of correcting them by means of lenses, is the practice of optometry. It is defined by law as 'The measurement of the powers of vision by any means other than drugs, and the adaptation of lenses for the aid thereof.'

"The moral is plain," concludes this pamphlet. "When a person desires medical service, he should call on a trained physician; but when an optical service is desired, he should consult a trained optometrist."

Medicine's last and extreme argument against refraction by the optometrist was that the optometrist is incapable of recognizing and treating diseased conditions which may, and in a small proportion of cases do, lie at the causation of defects of vision. This argument, of course, applies to any calling which has to do with any part or function of the human body, from the shoemaker who fits a special shoe to a troublesome foot to the dentist who treats an aching tooth. But in no case does it either invalidate or impugn the special service rendered.

The optometrist makes no pretensions to the diagnosis and treatment of disease. His province is the determination and correction of optical defects of vision. If the patient complains of defective vision, or of any of the numerous symptoms of eyestrain, such as headache, eye-fatigue, blurring, itching, watering of the eyes, nausea, and what-not, it is the optometrist's province to determine, by the application of optical measures, whether optical defects are present, and, where found, to correct them with lenses or prisms. If by these means he is able to give standard vision, and thereupon the symptoms complained of disappear, his task is completed. The trouble was clearly a non-medical trouble, and has been remedied by non-medical means. If, on the contrary, no optical defect is disclosed, or if, in spite of its detection and correc-

tion, the symptoms still persist, then just as obviously the case, aside from the refraction aspect, is one for medical attention, and should be referred to a physician.

As a matter of fact, however, the optometrist's relation goes further. He is a trained scientist. He studies and practises physiological optics, and is trained to recognize normal, physiologic conditions of the eye and of vision; by inference, also, to recognize when abnormal conditions are present, without attempting to identify or to treat them. A court of appeal in England, where as yet optometry is not even legalized, has recently ruled the responsibility of the non-medical refractionist, not, indeed, to diagnose diseased conditions of the eye, but to recognize a state of abnormality, calling for something more than mere refraction.

Optometry's rejoinder to this argument of medicine, therefore, is that, so far from deprecating the legalization of a qualified profession of optometry, it stresses the importance and value of the high degree of training and proficiency that it implies. And, on this very ground, the qualified optometrist, while practising in a field distinct and separate from medicine, becomes an invaluable cooperator with the broadminded physician in the conservation of human health and efficiency.

CHAPTER IV

Optometry's Reply to Medical Claims of Need for Use of Drops in Eye Examinations

One of the specific points urged by the medical profession against entrusting the work of refraction to the optometrist was that thorough and accurate refraction of the eye cannot be done without the use of a mydriatic, commonly known as "eye drops," (atropine or homatropine), for the purpose of relaxing the ciliary muscle during the test; and that, as a non-medical refractionist was prohibited by law from using drugs in an examination, it would be impossible for him to carry out such a test adequately. As stated in a previous chapter, one executive (Governor Deneen, of Illinois) under the advice of his medical counsel vetoed an optometry bill on that ground. And this objection is still being made in medical quarters to the work of the optometrist.

The argument for "eye drops" is based upon the theory that the muscle which controls the focusing power of the eye is apt to contract involuntarily, producing a spasm or unconscious muscular effort, and thus interfere with an examiner's determination of the true functional condition of the patient's eye. Hence "drops" powerful enough to paralyze this muscle and eliminate any possible spasm are said to be always necessary in order to arrive at a correct finding.

When this argument was offered by an oculist at a hearing before the Committee of the New York Legislature on the proposed New York Optometry Bill, the late A. Jay Cross then and there made the following reply and challenge: "The doctor has tried to prove that there are cases of eye trouble which could not be corrected without the use of drugs, and, while it may sound egotistical, yet I believe I can surpass him

in correcting cases, whether he uses drugs or not. He tells you it is impossible to do good work without drugs. I can tell you that he cannot do as good work with drugs as I can do without them. And, further, I am prepared to substantiate what I claim."

There was really nothing egotistical in what Dr. Cross said, for he simply voiced the sober claim of optometry, which it, also, is prepared to substantiate. The physician, who has not been trained in modern methods of ocular refraction, (and few of them have), may be unable to examine eyes for optical defects without the use of drugs; but optometrists are able to do so by means of their superior optical methods, which any medical man may adopt if he chooses.

A priori, the assertion that proper refraction without drugs is impossible would seem to be gratuitous. Columbia University, Ohio State University, California University, the University of Illinois, and other unimpeachable institutions of learning teach optometry, which is the scientific fitting of glasses without drugs. It is hardly reasonable to presume that such institutions would undertake to teach something which cannot be done. Columbia University explicitly states in its catalog: "This course also covers instructions in advanced methods for ascertaining the optical conditions of the eyes when functioning for both near and distant vision, so as to enable the student to deal with the so-called muscular deficiencies and spasms." The conclusion seems inevitable that the physician who finds it impossible has never taken the trouble to acquaint himself with advanced methods.

It is the spasm of accommodation, so-called, which atropine and similar drugs are supposed to relax. When the eyes are under the influence of these drugs they are reduced to practically the inanimate state of an optical instrument. To say that it is necessary to paralyze the focusing muscle of an eye in order to measure its seeing ability is as rational as to say that in order to test the dynamic power of a steel spring one must first destroy its temper.

When eyes are examined under the influence of a mydriatic, different allowances and deductions have to be made from the findings in order to prescribe the glasses which the patient can wear. Such allowances may or may not be accurate. As a matter of actual practice, it is doubtful if any user of drugs ever makes his final prescription from the finding thus obtained, but checks it by a second test after the effect of the drug has worn off. Certainly, no claim of accuracy can be truthfully made for this method.

The optometrist's argument against the necessity for drugs rests on the fact that if the focusing muscle is made to contract sufficiently, it will be impossible for a spasm to be present as long as this effort of contraction is maintained, and measurements of refraction made under these conditions will represent the true working power of the eye. By means of dynamic skiametry this can be done with great accuracy; and, as A. Jay Cross was himself the inventor of this method, he was justified in claiming, for himself and those who avail themselves of it, the superiority of technic which it gives.

Optometrists, therefore, examine eyes in their living, functioning state. If it is a static test, they know how to put the eyes at rest without the use of a drug. If it is a dynamic test, at near distance, the skiametric method employed by them not only does not call for a mydriatic drug, but such a drug would make the dynamic test impossible. When eyes are thus examined by an optometrist, without drugs, a suitable and comfortable pair of glasses can be readily determined without any problematical allowances or deductions having to be made. The finding of the test is the accurate working correction.

It should be added, and it is perfectly true, that considerable skill is required on the part of the operator to carry out these tests efficiently. His work will, therefore, naturally be always superior to that of the practitioner who, lacking the necessary technical training, is obliged to resort to the use of "drops" in lieu of optical technic.

So far as the oculo-refractive aspect is concerned, this is the whole case. If eye-drops are not only unnecessary to accurate refraction, but their use a far inferior method to the methods and instruments employed by the optometrist; and if the essential difference between them is one of training and skill in the use of those superior methods; then there is nothing more to be said. The issue is clean-cut, and it is for the public to decide which mode of procedure they prefer.

But optometry's further answer in this matter of drugs is that their routine use is distinctly dangerous. And in support of this answer it cites, not its own testimony, but that of the medical profession itself. Let us see what a few of the world's leading authorities in ophthalmology have to say on the subject.

In Haab and DeSchweinitz' *Atlas of Ophthalmoscopy*, a standard textbook, we find the following statement:

"No mydriatic is entirely free from the danger of producing glaucoma. Even eupthalmin has caused this disease. Witness a case from Knapp."

And on page 225 of the same book the statement is made:

"Dilatation of the pupil with atropine is positively known to bring on glaucoma if the eye is predisposed to the disease, or has already suffered an attack."

Dr. Ernst Fuchs, formerly Professor of Ophthalmology in the University of Vienna, in his *Text-book of Ophthalmology*, which is generally accepted as the standard work on that subject, says:

"Mydriatics can excite an inflammatory attack in an eye that is predisposed to glaucoma, and not only the powerful mydriatic, atropine, but also homatropine and cocaine."

Dr. John E. Weeks, in a *Treatise on Diseases of the Eye* by Posey and Wright, states as follows:

"Six to twelve hours after the instillation of a few drops of a solution of atropine into the eye, the lids become swollen and brawny and the conjunctiva injected. There is excessive lacrymation, a sensation of heat, and much irritation. Hyoscyamine, duboisine, and hematropine produce this disturbance also, but in a less degree. The effect is believed to be *idiosyncracy*."

In the same book we find the following, written by Dr. C. F. Clark, a collaborator of Drs. Posey and Wright:

"Not infrequently we find individuals in whom the smallest amount of atropine acts as a local poison in the conjunctival sac, producing a peculiar form of catarrh and a so-called eczema of the lids. It is sometimes stated that this is due to impure solutions; but by rigid sterilization and the observance of every reasonable precaution the writer has convinced himself that this is not the case."

We also find a chapter written by E. Treacher Collins, of England, in which the following occurs:

"The use of a mydriatic, such as atropine, in an eye predisposed to primary glaucoma is very liable to cause an increase of tension, and its application may excite acute attacks."

There is, indeed, no need for further citations, which, if extended, would include every recognized authority in ophthalmology. There is not an oculist in the world, or a pharmacologist, who will deny the risk of possible ill effects from a mydriatic. The plea in extenuation is that mischief would occur only in those cases which were predisposed to it, or in which there is an idiosyncracy to the drug, and that the risk is therefore small. But who, pray, is to determine whether such a predisposition or idiosyncracy exists? And what consolation is it to the patient in whom it does wreak damage to be told that the mydriatic merely "brought the predisposition or the idiosyncrasy to light?"

There is no disposition to exaggerate the situation, nor any need to do so. It may be conceded, for the sake of argument, that ninety-nine patients out of a hundred, or nine hundred and ninety-nine out of a thousand, undergo atropization, or treatment with some other mydriatic, without apparent ill effects. The risk still remains. The oculists themselves taboo the use of drugs in persons over 45 years of age. But young children, in whom, more than in any others, their use is insisted on and practiced, are, as every medical man well knows, frequent subjects of latent glaucoma and similar conditions. And in all instances of their use, at whatever age, the susceptibility of the patient to their poisonous effects must remain largely unknown until the experiment has been tried.

This much being admitted by the medical profession itself, what room is there for exaggeration? It is strange, to say the

least, that a profession which rightly insists so strenuously, in season and out of season, against the introduction into the human body of even the simplest drugs except upon a most definite indication, and with the fullest knowledge of their effects, should advocate and practice a routine use of these powerful agents for such a widespread purpose as the fitting of glasses.

The rejoinder that this constitutes the very reason why medical men alone should be entrusted with the work of eye refraction will hardly do. For if the instillation of a mydriatic is, as claimed, harmless in the great majority of persons under 45, it would be harmless whether made by a physician or a layman. And if the risk lies, as it is said to do, in cases of predisposition or idiosyncrasy, such risk, in at least a large number of instances, bechances the medical man as much as it does the patient. The only consideration which would justify such a routine use of mydriatics, under such risks, is that of necessity, or at least of advantages which outweigh the risks,—the old assertion, again, that refraction cannot be adequately done without it. And optometry not only affirms that it can, but has produced the methods for doing it, and, by the use of those methods, is daily performing better refraction without drugs than can possibly be accomplished with them.

It would seem, lastly, that not all the medical oculists, by any means, advocate and practice the use of mydriatic drugs in refraction. It has its impugners among some of the most distinguished living ophthalmologists, several of whom have quite recently voiced their opposition to it before national and international gatherings of their specialty. We cite here a few of those utterances from medical authorities:

William George Sym, M. D., F. R. C. S. E., Ophthalmic Surgeon, Edinburgh Royal Infirmary; Lecturer on Diseases of the Eye in the University of Edinburgh, in his text-book for Students and Practitioners, says, page 72:

“The argument in favor of atropine falls to the ground. . . . My practice, founded upon satisfactory experience, is not to administer a mydriatic.”

Herman Snellen, M. D., Ophthalmic Surgeon, Netherland Hospital, Utrecht, Holland:

"Any mydriatic solution instilled in the conjunctival sac may produce general disturbances which sometimes assume a most alarming character and may even cause the death of the patient."

T. Harrison Butler, M. A., M. D., M. R. C. S., etc., England, a leading authority on Ophthalmic subjects, before the Ophthalmological Society of the United Kingdom in 1922 said:

"I was encouraged to give up cycloplegics by my friend, Dr. Deverux Marshall, who told me that he regarded them as unnecessary. . . . The amount of confusion caused by a dilated pupil where there is an error of refraction is extraordinary. I can be more accurate with a moderate-sized pupil than with a dilated one. Many children are frightened by the instillation of drops, and the cycloplegic defeats its own end."

"There is one vital objection to a cycloplegic: one has to guess how much to allow for the drug in ordering glasses. . . . In two of my hospitals I now rarely use a cycloplegic. . . . In conclusion, I suggest that refraction without a cycloplegic is as accurate as that with one, if only sufficient experience and skill are at the command of the refractionist. If not, then many of the most eminent men in this country, and in others, must be making countless mistakes. I confess that they have not come my way."

J. Burdon-Cooper, M. D., in an address before the Convention of English-speaking Ophthalmological Societies, held in London, in 1925, said:

"Total hypermetropia under atropine is less than the manifest when the eyes are tested binocularly without atropine."

A. E. Davis, M. D., of New York, at the same convention, agreed that—

"Burdon-Cooper's method gives better refraction correction than any cycloplegic."

N. J. Weill, M. D., of New York, in the **New York Medical Journal**, Oct. 19, 1912, says:

"I believe that the ophthalmoscope, ophthalmometer and trial lenses without a cycloplegic will give equally satisfactory results as a rule."

E. A. Pond, M. D., of New York, in the **Medical Record**, June 24, 1916, asserts:

"I find that it is not necessary to use a mydriatic in any case of refraction. One never prescribes the correction found under atropine, and homatropine does not act long enough to be of much use."

He reinforces these statements by referring to more than 8,000 refractions of his own which gave better results without a mydriatic than with one, and, of course, he emphasizes also the loss from business when a cycloplegic is used.

Joseph Heitger, M. D., in discussing a paper before the Ophthalmological Section of the Kentucky Medical Association, in 1928, said:

"There are some very prominent oculists in this country who rarely use a cycloplegic except in children, and yet get accurate results with comfort to their patients. One of these outstanding men is Dr. Walter Lancaster of Boston, a man whose knowledge of physiologic optics cannot be questioned, and yet he is one oculist who gets excellent results without using a cycloplegic routine. He uses minus cylinders with fogging."

From which it is apparent that some, at least, of the world's leading oculists have discovered and adopted the more excellent way. If these men, as Dr. Heitger says, get accurate results, with comfort to their patient, without using a cycloplegic routine, it would appear that the burden is on those who complain that they cannot, and do not, search and see what it is that they lack, which the others possess.

So far as optometry is concerned, however, it is not a matter of difference of opinion between man and man, or between this and that class of men, but of scientific fact and clinical demonstration. The scientific principle is there for all who care to investigate it, and its method for all who take the pains to master it; and the clinical demonstration is being made daily by competent, qualified optometrists throughout the world.

CHAPTER V

Medical Approval of Optometry

As previously intimated, now that the war is over there is no disposition on the part of optometry to indulge in post-mortem recrimination. It has already been conceded that the opposition offered by medicine to optometric legislation was the natural, biologic reaction of long undisturbed occupancy to the invasion of a new claimant. Without the legal struggle that ensued, optometry's right and title in the premises could never have been definitely established. The keener and more pertinacious the opposition, the more decisive the victory. As a result of the conflict, optometry's position was established, in a far-reaching and conclusive fashion that admits of no future challenge. That result speaks for itself, and is sufficient so far as optometry and the public are concerned.

This view of the matter, however, does not preclude a word of honorable mention for those members of the medical profession, especially among the ophthalmologists, who were far-sighted and broad-minded enough to recognize from the outset the justice of optometry's claims, the real and urgent need for regulation of an intolerable state of affairs, and the public advantage to be gained by optometric legislation, and who had the courage and bigness to take a stand in accordance with their convictions.

From the rank and file of the medical profession very little, if any, opposition was encountered. On the contrary, thousands of general physicians and family doctors voiced their definite approval of optometry's efforts. In the campaign for optometric legislation in the State of New York, the Association sent return postal cards to every physician in the State, asking for an expression of his attitude toward the proposed legislation, and received several hun-

dred replies, definitely favoring it. And this canvass of opinion was repeated in several other States, with similar results. At that time, and ever since, the general medical practitioner has shown a liberal disposition to recognize the status and qualifications of the optometrist and to cooperate with him in their joint service to the public.

Among the oculists themselves, however, there were not wanting men of broad vision and liberal mind who were big enough to rise above the traditional and the economic viewpoint, and to align themselves on the side of optometry. Some of these were passively acquiescent; they stood aside and refrained from putting any obstacles in the way of optometry's efforts. Others, to their everlasting honor, spoke out openly in favor of optometric legislation, and lent active endorsement and support to the movement.

No less a distinguished medical authority than Dr. Edward Anthony Spitzka, of New York (since deceased), in the year 1916, in a letter addressed to the late P. A. Dilworth, then, as always, an active member of the New York and national optometric organizations, expressed in no uncertain terms his respect for optometry and optometrists. Following is a verbatim copy of his letter:

"When an individual's vision becomes impaired I would rather have him to go to an optometrist first. The optometrist receives an exacting and rigorous training in the schools; as a candidate for licensure he is subjected to a critical examination; and as an active specialist in this field he acquires a special aptitude for the manipulation of instruments and the recognition of every variety of eye abnormality which only a few medical practitioners can enjoy.

"In the majority of cases the chances are that only correcting glasses are needed. In the small minority in which a truly diseased condition exists the optometrist can be relied upon to recognize the pathologic state and may be trusted to refer the case to a practitioner, oculist, neurologist, or other suitable medical specialist. As I view it, optometrists are not desirous of invading the field of ophthalmology, and are content with the statutes which confine their practice to eye testing and lens fitting.

"As you know, I have followed with interest the progress made by you and your fellows in raising optometry to a dignified position, signalized by favorable legislative enactments in most of the States, (I recall the words of approbation of Governor Hughes), and by the creation of courses of instruction in several leading colleges and universities. I can only see the

advantages thereof; I fail to see wherein there can be any conflict between your profession and mine. On the contrary,—and it gives me pleasure to record here my personal experience with you,—a most salutary cooperation is feasible.

“Who benefits? The public.

Sincerely yours,

(Signed) Edw. Anthony Spitzka.”

On receipt of this generous expression, Dr. Dilworth wrote to Dr. Spitzka, asking if it was agreeable to him to publish his letter, and to use it in the furtherance of optometry’s legislative efforts, to which the good doctor replied:

“Of course you have my permission to publish my letter of yesterday’s date, and also to use it at legislative hearings in the ten States still remaining without recognition and regulation of optometric practice.”

During a legislative campaign in Missouri, in 1913, Dr. John Green, Jr., a distinguished oculist of St. Louis, published an article on the subject in the Interstate Medical Journal, Vol. xx, No. 1, under the title of “Optometry Legislation in the United States, with Special Reference to the Proposed Missouri Optometry Law,” in which, while it cannot be said that he wholeheartedly advocated the legalization of optometry, he sensibly pointed out the need for it, and the unwisdom of opposing it. After mentioning what he considers some of the objectionable features of the movement, Dr. Green says:

“On the credit side of optometry must be recorded the fact, which the writer thinks is undoubtedly, that in the long run,—not immediately because of the exemption clause,—this law has a tendency to drive from the State a great many traveling vendors, ten-cent spectacle peddlers, and others of that ilk, who could not pass the more or less rigid tests of the Board of Examiners.” . . .

“Conditions in States which have no optometry laws,” continues the writer, “are inconceivably bad, and offer no support to the arguments of those who still oppose any and every form of regulation. Consider Missouri, for instance. Every jewelry store of any pretensions has its ‘Doctor’ who tests eyes and offers sage medical (?) advice. The same is true of department stores. The word ‘Doctor’ is used by some retail optical firms as a part of the firm name. The ‘Doctor’ So-and-so Spectacle Company does a flourishing mail order business. This concern sends to each prospective customer a little chart of test letters and the eyes are fitted

on the basis of the answers received. Any Tom, Dick or Harry can supply himself with a trial case, test cards, etc., and armed with the title of 'Doctor' plucked out of the air roams at will from town to town, testing the sight of all who seek his 'professional' (?) services. The 'Optical Department' in the ten cent stores does a flourishing business."

The case for the necessity of optometric legislation could hardly have been more forcibly and trenchantly put by counsel for optometry itself. But Dr. Green proceeds to a still further practical analysis of the situation:

"Let us try to look at this matter from the legislator's standpoint. He knows that so long as there have been spectacles, opticians who tested the eyes have existed. He may have purchased his own glasses from such an individual. He knows that some opticians are more successful than others, and naturally infers that the training and ability of some are superior to the training and ability of others. He probably knows of some person who has failed as a tradesman and who, after a few weeks' course in an optical school, has appeared again in the community as an 'eye tester.' Is it not then perfectly natural that he should listen with favor to the pleas of the optometrist that the law asked for is based upon the fundamental principle of compulsory education, that it will force out of the State opticians incompetent to fit and prescribe glasses, that those who adapt glasses to the eyes should prove their fitness to do this work intelligently and legitimately?"

"For a number of years," continues Dr. Green, "many thoughtful ophthalmologists, viewing with distress the enactment of objectionable optometry laws in an ever-increasing number of States, began to question the wisdom of an uncompromising, unrelenting opposition on the part of the profession. . . . The practice of spectacle fitting by opticians and optometrists has become firmly established, and is universally recognized as a legitimate business by all classes of the community, with the exception of that small part of the medical profession which has interested itself in opposing optometric legislation. With public sentiment everywhere favorably disposed, the idea of legislating this business out of existence is the wildest of impossible dreams. And since it cannot be legislated out of existence, it ought to be regulated and controlled by the State. And right here is where medicine has failed to grasp a golden opportunity to do constructive work toward safeguarding the eyesight of the people,—not by relentlessly opposing any and all optometric legislation, but by insisting on the addition to each and every bill of such clauses as will eliminate all but well-trained and well-equipped optometrists."

Again it is submitted that optometry herself could hardly have prepared a stronger or more convincing brief for optometric

legislation than is here presented by a distinguished member of the ophthalmological branch of the medical profession. His conclusion is logical and to the point:

"The history of the professional fight against optometry clearly shows that uncompromising, relentless opposition,—the opposition that has been carried on under the slogan 'no compromise and no recognition'—has not prevented the passage of bad optometry laws. Members of the profession who continue to advocate this type of opposition are no doubt actuated by the best motives, but seem not to recognize that they are actually playing into the optometrists' hands by fighting a bill which is not only fair to the medical profession, but must prove a check on the uncontrolled practice of fitting spectacles among non-medical men. If the uncompromising policy pursued today by the medical profession is going to result—and in the writer's opinion it must inevitably result—in the eventual passage in every State of the Union of bad optometry laws, then he declares that it is not in the interest of the medical profession or of the public for such a policy to be maintained any longer."

It would seem that other medical ophthalmologists were, about this time, being forced by the logic of events to see and recognize the light. For, in a paper read on June 28, 1911, before the Ophthalmological Section of the American Medical Association, Dr. Edward Jackson, ex-chairman of the Section, ex-president of the American Academy of Ophthalmology and Otolaryngology, and ex-president of the American Ophthalmological Society, who had been one of the most implacable antagonists to optometric recognition and legislation, made the following modified statement:

"The attempt to ignore this agitation is folly; but mere opposition, the determination to 'stand pat' is almost equally fatuous. If the optometrists are able to convince the public and the legislatures that laws are needed to protect the eyes of the people from the doings of optical fakers, mere opposition to any and every law on the subject places the medical profession in a false and indefensible position. If something is proposed as a measure to protect the public health, it is not for those who claim the right to advise on all such matters merely to oppose, while themselves suggesting nothing. It is more consistent, more public-spirited, and more effective, to endeavor to modify legislation so as to make it supplement and support the laws now enforced with reference to medical practice."

The position thus taken by Dr. Jackson was supported by another oculist of international reputation, a man who, more than

any other in this country, has had the welfare of the people's eyesight at heart, Dr. F. Park Lewis, Chairman of the Committee on the Prevention of Blindness of the American Medical Association. He said:

"We might just as well face things as they are. We are never going to get rid of optometry, existing as it does, by simply opposing it. I think if we were to get together the record of the bad work of the untrained doctors, it would at least very nearly equal that coming from the optometrists."

One feature of the situation admitted, rather reluctantly, by such men as these, in addition to medicine's failure to curb the existing abuses, was the inadequacy of the medical profession to cope with the widespread need for eye refraction. The oculists were too few in number, and the general practitioners of medicine neither qualified nor interested in becoming qualified. Dr. Green referred to this in the address already quoted from:

"The present paucity of oculists," he said, "in relation to the number of people requiring glasses, indicates very definitely that the glassing of the people cannot come exclusively through ophthalmic specialists.

"The late Dr. Leartus Connor sought to interest the general practitioners in what he called 'simple refraction' for the purpose of having a large group of men engaged in general practice take over the patients who now drift into the hands of the optometrist. This movement, which gained a certain impetus during Dr. Connor's lifetime, received only a half-hearted response from the oculists, who realized that the art of refraction is a difficult one, only acquired after long practical experience, and hence not to be 'picked up' by general practitioners in their comparatively few hours of leisure. They felt sure that the refraction done by such general practitioners must necessarily be mediocre, and would be more likely to bring the profession at large into disrepute than to prove an effective method of doing away with the refracting optician. The latter, encountering, say, twenty-five individuals in a single day, all of whom are put through some form of test, must necessarily acquire a certain amount of skill; a vastly greater amount, indeed, than can possibly be acquired by the general practitioner who may see twenty-five refractive cases in the course of six months."

That this was, in fact, one of medicine's weak points in its opposition to optometric legalization, constituting, as Dr. Jackson aptly said, "mere opposition, while themselves suggesting nothing," is bluntly pointed out in the editorial which appeared in *The Medical Brief*, under date of October 1925:

Medicine and Optometry

"The fight between the optometrists, struggling for legal and professional recognition, and the medical fraternity, opposing their claims, goes merrily on. We have purposely kept out of the fray—as indeed we noticed most of the medical journals have done—chiefly because we have felt the question at issue to be one of what the French call **convenance**, rather than of principle, and destined to settle itself by a sort of 'survival of the fittest' process, in which neither the optometrist nor the physician, nor even the legislatures directly, would be the ultimate umpires, but the public at large. We confess we have not been able to discern in the issue any of those grave or crucial features which certain of our oculist friends, in their enthusiastic opposition to the optometrists' pretensions, have read into it.

"The fact is that all of those conditions which the oculist declares the legalization of optometry will precipitate upon us are already present among us in far worse and more unrestrained form than optometrical legislation contemplates. If it be really a matter of principle that refraction be a function of medicine, why does not the medical profession enact a clause in its various medical practice acts, making it a part of medical practice, and prohibiting its performances by any but qualified medical practitioners? If the reply be that such clauses have been introduced into the legislature and defeated, then the rejoinder naturally suggests itself that for a matter of principle, supposed to be dearly held by every medical man, and easily demonstrable to every intelligent layman, this is a strangely poor showing. How many medical men, with what degree of enthusiasm, went to the support of the principle? As we have pointed out, not only is the principle (if it really be one) at issue, but all of the evil conditions supposed to spring from its violation are in such active evidence as to render the optometrists' pretensions quite a superfluous consideration. And yet no serious effort is made by the medical profession to put a sharp, decisive test to the matter on the frankly avowed ground of principle.

"Let it be understood that we are not arguing the optometrists' case. We have nothing to do with the optometrist, either to applaud or to criticize him. But it is both our concern and our duty to apply the lash of criticism and inquiry to our own profession. One of two things is true: Either the medical profession, in this optometry matter, is criminally and unspeakably negligent upon a question of vital importance to public health and safety, or else the great majority of thoughtful medical men do not regard it as a vital issue at all, but, as we ourselves are disposed to do, as one of **convenience** and practical expediency.

"From whichever point one views the subject, but more especially if one regards it in a practical rather than an academic light, it cannot fail to occur to the observant onlooker that medicine has foolishly neglected the only argument in her favor which could carry any practical weight. As we

have previously said, our view of the matter is that the public must be the ultimate arbiters, and there is but one argument for which the public has any serious respect, namely, the competency of the refractionist, whether he calls himself an oculist or an optometrist, to refract. In all of the campaign conducted by the medical profession against the optometrists' claims, this argument has been lamentably wanting. The reason is obvious; the ordinary practitioner of medicine is **not** competent to refract. And this is the true weakness of medicine in its attitude toward optometry.

"The best reply of medicine to the optometrists' propaganda is the fitness of medical graduates to do refraction. It cannot be supposed or expected that the great majority of people needing glasses will go direct to an oculist. Oculists are too few and inaccessible; their prices are too high, and one may even be permitted to seriously question whether they are, as a rule, the best refractionists, anyway. They are too often engrossed in the intricacies of ocular surgery, to the neglect of refraction work. But, in any case, few of the public needing glasses will go to the oculist. To whom, then, shall they go?"

CHAPTER VI

Press Support of Optometry

In the furtherance of any sound, worth-while movement for the betterment of humanity the public press can always be relied upon to lend its aid and support. And optometry's fight for State regulation was no exception to the rule. The lay press, with its customary acumen, was quick to recognize the public interests involved, and as soon as it acquainted itself with the facts in the case, the issues at stake, and the true aims of optometry, almost without exception it threw the weight of its influence on the side of optometric legislation. In the course of the campaigns in various States, numerous editorials appeared in the local newspapers, endorsing the need for such legislation, and urging its passage. Optometry gratefully acknowledges the powerful effectiveness of this support, for which it will ever hold itself indebted.

Here, as in other directions, it is impossible to mention by name all the newspapers that came to the aid of the cause, or to cite all the editorials in which that assistance was embodied. A general acknowledgment must suffice. We cannot, however, refrain from quoting a few of these representative utterances, as indicative of the clear-sighted, outspoken attitude of the public press toward optometry's crusade while it was still in the thick of the struggle.

In the spring of 1908, when the optometrists of New York State were engaged in what proved to be their final and successful fight for an optometry bill, The Elmira Star Gazette, of Elmira, New York, in its issue of March 17, printed the following editorial:

Regulate Optometry

"The Optical Society of the State of New York, by means of circulars, is calling attention to the fact that some opposition has developed at

this late day to the proposed Optometry Bill promised by the last Legislature.

"Those conversant with the situation remember well that there was strenuous opposition last year to the Unity Medical Bill, as originally drafted, because of the drastic wording, which operated directly against the men engaged in optometry. It proposed to make the fitting of lenses and refraction of the eyes a part of the practice of medicine and to shut out all save physicians from the work.

"So great was the objection to this phase of the bill, in order to secure the passage of the medical measure, optometrists were exempted from its provisions. It was with the understanding that a special Optometry Bill was to be passed this year that all objection to the Unity Medical Bill was withdrawn.

"Now there seems to be objection to the carrying out of the compact with the optical men. And, strange to say, this objection comes from certain prominent physicians.

"The Optical Society asks the enactment of a law that will regulate the practice of optometry the same as medicine and dentistry are regulated. It is asked that provision be made for the examination and licensing of all men who would engage in the practice. Why there should be objection to this proposition is beyond understanding.

"The people of the State of New York should demand the enactment of such a law. They should demand protection from the numerous fakirs and quacks who prey upon the unsuspecting and gullible people under the guise of opticians. The eyes of the people should be protected.

"It was absurd last year to argue that only physicians are competent to fit lenses to eyes. It is just as absurd today to argue that an Optometry bill is not needed. There seems to be only one phase of the question.

"And, beside, a promise has been made. Whether it be in public or private life, the man who makes a promise and then fails to keep his agreement must ever after be placed in the list of irresponsibles.

"The Legislature should disregard the agitation which will favor only the charlatans—and should do its duty, not only to the optometrists, but to all the people."

A few days later, in its edition of March 19, the following editorial appeared in the Utica Press, of Utica, N. Y.:

To Require Proven Competency

"Fortunately for the people there is a marked disposition on the part of State Legislatures to require proof of competency before granting license to practice any vocations where lack of skill may be a public menace. Medical examinations and the law examinations are characterized by higher standards than ever before and it is a blessing that they are. Before the

practice of dentistry can be indulged in, competency must be proven and people are thus protected to their permanent benefit. The effort has been and is being made by opticians to secure much the same sort of protection for themselves and their clients and last year such a bill passed both houses of the Legislature in this state but was vetoed by Gov. Hughes because of manifest inattention to certain important technicalities. This year a bill the same in substance, but heeding the points made by the governor, has been introduced and is progressing. It is known as the optometry bill and optometry is defined to be the employment of any means other than the use of drugs for the measurement of the power of vision and the adaptation of lenses for the aid thereof. There is a marked difference between an oculist and an optician.

"The business of making and selling spectacles, eye glasses, etc., is followed by a good many people with varying degrees of skillfulness. The argument in favor of consulting an oculist for any eye trouble is a good one, on the theory that his training and knowledge are of value to the patient and will prevent him from making any mistake in diagnosis and treatment. The same argument applies in support of the present optometry bill before the Legislature. If others than oculists are to fit and prescribe glasses, by all means limit the practice to those who by proven skill through study or experience are able to do it properly. Many a time has eyesight been irretrievably damaged by the purchase of a pair of spectacles from somebody who had no other knowledge about them than concerned with the cost and the selling price. The good opticians say there are 12 states in this country that have such a law as New York now seeks and that spectacle vendors from the whole dozen are dumped into those other states where they are permitted to ply their trade to the detriment of their customers. The oculist must pass a stiff state examination before he can practice and the more of that sort of thing the optician can be subjected to the better for the public, and then in that department of commercial and professional activity it will be the survival of the fittest."

On March 14, 1908, in its afternoon edition, the Syracuse Herald, Syracuse, N. Y., had this to say on the subject:

The Optometry Bill

"For several years the leading opticians and optical societies of this State have been endeavoring to obtain the enactment of a measure which would provide for the proper regulation of their business, or profession, by State authority. Heretofore, the effort has failed, owing to influential opposition from various quarters, and perhaps to fatal defects of the bills drafted for the purpose. Last year, however, the Legislature passed an optometry bill, and the desired end was for a time in sight. But Governor Hughes vetoed the bill, not because he was hostile to its principal object,

but because of certain technical objections, and because the measure did not place the proposed system of regulation under the jurisdiction and control of the State Board of Regents. Another optometry bill is now before the Legislature which was drafted to meet the Governor's criticisms. It has been favorably reported by the Senate public health committee and is now in the hands of the corresponding committee of the Assembly.

"In this measure the practice of optometry is defined to be the employment of any means, other than the use of drugs, for the measurement of the powers of vision and the adaptation of lenses for the aid thereof. It provides for the appointment by the Board of Regents of a competent and experienced State Board of Examiners in Optometry, which shall be empowered to examine applicants who desire to practice optometry and to issue certificates of fitness, or licensing certificates, to all who successfully meet the prescribed tests. Optometrists already engaged in practice for a period of two years or more, who can satisfy the Board of Examiners as to their character and qualifications, are exempted from the examination, but must procure a certificate of exemption. No person not possessing a certificate of registration or exemption shall hereafter be permitted to engage in the practice of optometry in this State.

"It seems to us that no reasonable objection can be offered to this system of State regulation, while, on the other hand, it should serve the excellent purpose of excluding the unworthy and incompetent from an occupation in which skill, experience and good judgment are notably required. As we understand it, the optometrists are not disposed to claim any more for their profession than the facts warrant. Every reputable optician confines himself strictly to eye measurement and the fitting of lenses, and where diseases or serious infirmities of the eyes are revealed he turns the applicant over to an oculist. Within the limits of his practice as they are defined in the proposed law, he is entitled to ask for State supervision and regulation, to the end that quacks and pretenders may be disqualified and eliminated. The passage of the bill would be apparently in line with sound public policy."

On March 20, of the same year, the Utica Herald, of Utica, N. Y., urged the passage of the optometry bill in the following editorial:

The Optometry Bill

"A bill now before the Legislature which would receive favorable consideration is that providing for State regulation of the practice of optometry, which is defined to be the employment of any means, other than the use of drugs, for the measurement of the powers of vision and the adaptation of lenses for the aid thereof. A similar measure was passed last year, but Governor Hughes was unable to approve it because of certain technical objections. This year's bill meets the Governor's objections.

"The purpose of the bill is to safeguard the people of the State against 'spectacle fakirs' by compelling those who examine the eyes of others to prove their competency. Similar laws have been enacted in many other States and their operation has driven a large number of persons who were unable to qualify for practice under them into New York, where they can ply their trade without hindrance as things are at present. The New York bill delegates the regulation of the practice to the Board of Regents, as is in the case of dentistry practice.

"The principle of the bill is followed in various provisions of the Health Law, and it has the approval of practitioners generally. Last year's measure passed both Senate and Assembly by an almost unanimous vote and similar approval may be expected of the corrected bill this year."

The Buffalo Express, of Buffalo, N. Y., in its March 17 issue, gave endorsement to the measure in a decisive editorial utterance.

Protecting the Eye

"The optometry bill in the Assembly is so undeniably in the interests of the people that no argument save a knowledge of its provisions should be necessary to insure its passage. The measure provides that on and after January 1st next all persons desiring to measure the powers of individual vision, otherwise than by the use of drugs, and to prescribe glasses for the correction of defective vision, shall be 21 years old, shall have a preliminary education equivalent to two years in a high school, shall have studied three years in a registered optometrist's office or have been graduated from a school of optometry, and shall pass a qualifying examination. Exemptions may be made in the case of persons who have been continuously engaged in the practice of optometry in this State for more than two years next prior to the passage of the measure.

"These are reasonable precautions to take for the protection of the eye from ill treatment at the hands of any who might assume the ability to prescribe without possessing the necessary qualifications. Interest in the bill should be wide in comparison to the number of persons who wear glasses rather than in comparison to the number of persons who would practice optometry."

Under a title which exemplifies the keenness of the press to penetrate the true inwardness of the movement, the Utica Observer, of Utica, N. Y., in its issue of March 28, 1908, thus sizes up the situation:

To Protect the Eye

"A bill that was passed by the Legislature last year, that came to be known as the 'Optometry bill,' was not signed by Governor Hughes because

of some minor details to which he objected. The bill of last year did not give to the State Board of Regents the control of the examination, etc., which the Governor thought should be incorporated. The bill has been changed this year to meet fully with the objections of the Governor, and it is now in the hands of the Assembly and Senate. The committee of the latter body has reported it. There appears no objection to the present bill, and there is no apparent reason why it should not become a law.

"The bill seeks to prevent unauthorized persons from fitting glasses. It does not attempt to prevent dealers from selling glasses to customers who may wish to pick their lenses from a stock in hand, but it says that there shall be no pretense on the part of a dealer that he is able to fit glasses to people who apply for them. It appears to be a reasonable proposition. There is no doubt that a great deal of fraud is practiced in this business, and many people set themselves up as optometrists who have not devoted themselves to a study of the science. Under the law that is sought, it will be an offense to 'practice or offer to practice optometry, or the public representation of being qualified to practice the same by any persons not authorized to practice optometry.'

"That is a safe stand to take in anything, and surely is this true when it affects such an important thing as the human eye and its treatment. What is wanted is less fraud and fake, and if the optometry bill will do away with these dangerous characters in the realm of optometry, it may well become a law."

The Rochester Democrat-Chronicle, of the same time, at Rochester, N. Y., discussed the optometry bill and its significance from a characteristically practical standpoint:

The Optometry Bill

"Probably no one needs to be told that the proper fitting to defective eyes of corrective glasses is not an operation that can be performed with complete success by the 'man in the street,' guided only by the light of nature. Also most persons are aware that, the eye being a somewhat delicate organ, disastrous results may easily be brought about by the use of glasses unsuited to the eyes they are supposed to aid. Most persons will, therefore, probably be somewhat surprised to learn that, in this state, any swindling ignoramus who can beg, borrow or steal a stock of lenses, can go about pretending to 'fit glasses,' so obtaining money by false pretenses, to say nothing of the likelihood that he will irreparably injure the eyesight of his victims, with none to molest him or make him afraid.

"This is the fact, though. In this state, where barbers, horseshoers, plumbers, etc., are required to prove that they know something about their business before they are allowed to follow it, anybody who chooses is at full liberty to practice, try to practice, or pretend to practice, optometry; though

to apply the proper corrective lenses to defective eyes is a considerably more scientific operation than to apply a razor to a man's chin or a shoe to a horse's hoof, and the capacity for mischief of the incapable optometrist is infinitely greater than that of the incompetent barber or farrier. The unpleasant truth is that if you need, or think you need, glasses, your eyesight is at the mercy of any smooth-tongued humbug who may succeed in winning your confidence.

"Of course this isn't as it should be. Other states have perceived the evil and have applied the remedy—a law regulating the practice of optometry. New York, however, is lagging behind the age in this particular. This is not because intelligent and specially qualified citizens—physicians, oculists, opticians, optometrists—have not perceived the importance of remedying this evil, but because, spite of their best efforts, they haven't been able, as yet, to make the Legislature perceive it.

"Last session there was introduced into the Legislature 'An Act to Amend the Public Health Law by Defining Optometry and Regulating the Practice Thereof.' If memory serve it was read once, referred to the Committee on Public Health and never reported out. It will shortly be again brought to the attention of the Legislature. This time it should be promptly passed, unless somebody is able to show some good, sound, practical reason why it should not become a law. It is a thoroughly well-considered measure, modeled on laws now in actual and beneficent operation in other states. It is no experiment. It is frankly and heartily indorsed by a great body of respectable and responsible citizens, expertly familiar with its subject. There is no 'graft' in it. It furthers no special interest. It attacks no vested interest. It is devised solely in the public interest, and its passage is imperatively demanded by considerations of the public welfare. There is every apparent reason why it should become a law this year. If there is any reason why it shouldn't, the Democrat and Chronicle has yet to be informed of it."

Public Health Demands It

"The bill now in the legislature to establish a State examining board for optometrists and to better regulate the practice of optometry should be made a law. Optometry is a distinct and separate science from that of the oculist or of the doctor of medicine and surgery. The oculist is a physician who makes a specialty of eye diseases and treats them with medicinal remedies. The optometrist is not a physician. He is one who fits the eyes with glasses. He uses no drugs in measuring the power of vision and adapting a lens to the eye. His work is scientific and is determined by fixed rules. It is professional the same as that of the oculist. The general public confuses the terms, oculist, optometrist and optician. The latter is simply one who makes and sells optical glasses

and instruments. He may be a professional optometrist, or he may not. However, he should be, the better to do the business he is engaged in.

"The eye is the most delicate organ of the human body, more delicate than the heart. It is the window to the soul and it requires great skill for proper treatment. The oculist, the physician who makes a specialty of eye diseases, is not necessarily an optometrist, as a rule he is not, and the optometrist is not an oculist. He may know but little about the diseases of the eye and their medical treatment and still be a skillful optometrist. Any law which recognizes the natural and absolutely fixed divisions between the professions and tends to safeguard and protect the public in the practice of each is of incalculable benefit. The medical schools know nothing about optometry. They do not teach optics. Medical laws do not deal with them, for we repeat, optometry is not a medical science. It is purely and solely an optical science and it should have its own board of state examiners. Public health and protection demand it. A similar bill was passed almost unanimously last winter but was vetoed by the governor, for what reason the Lord only knows."

In 1910, plans were under way to institute a chair of optometry in Columbia University, New York, in connection with the Department of Physics. This proposal aroused anew the opposition of the medical profession, and brought forth an editorial in the *Medical Record*, of New York City, voicing that opposition. To this complaint of the *Medical Record* the *Elmira Star-Gazette*, of Elmira, N. Y., in its issue of June 17, 1910, made the following editorial rejoinder:

Optometry and Medicine

"The *Medical Record* thinks it is bad enough that the State should give the optometrists the right to prescribe for sick eyes without knowing anything about medicine, but it is worse to give them the moral support of a quasi-degree from a great university."

"This expression is prompted by the action of Columbia University in establishing a chair in optometry and prescribing a two-year course of study of that subject in its curriculum.

"Some newspapers, notably the *New York Sun* and the *New York Press*, have taken the same view of the matter and have striven to belittle the efforts of Columbia toward the uplift of a profession which, *per se*, is only just born, but which is here to stay.

"Since practically the only hue and cry against the optometrists comes from, or seems to be inspired by, the medical profession, one cannot help entertaining the idea that the objection is born of selfish motives.

"In the first place, the optometrist DOES NOT prescribe for sick eyes.

He has nothing whatever to do with sick eyes. His work is purely physical, not medical. He makes no attempt to treat diseases of the eyes nor to render assistance in case of eye injury. These he very properly turns over to the eye-physician and eye-surgeon, the oculist or the ophthalmologist. The only province of the optometrist is to correct by PHYSICAL means a PHYSICAL DEFECT of vision.

"Recognizing this province, Columbia University very rightly has incorporated the chair of optometry in her department of physics, not in her department of medicine.

"By offering this course to those who would become optometrists, Columbia is doing much to raise the standard of that profession. Within the recent past much has been accomplished by high-minded optometrical practitioners toward the elimination of the quack and the incompetent spectacle vender and toward establishing a standard of educational requirements that will prove at once a protection to the public and to the honest practitioners.

"No one knows better than the sincere optometrist that the public has been unmercifully 'faked' by spectacle quacks and that untold damage has been done by misfitting lenses. And to the optometrists is due all the credit for legislation that will make such quackery impossible in the future.

"The Star-Gazette has no sympathy whatever with the hundred and one pseudo-medical cults that are seeking recognition and protection, but it does appreciate what the optometrists are trying to do to protect the people.

"The Star-Gazette fails to see wherein or why a medical education is essential to a proper physical examination of the refracting power of the cornea and lense of the eye any more than it is necessary for the proper measurement of a pair of shoes for the feet.

"There is no demand that the dentist shall attach an M. D. to his name before he can operate on the teeth. Why, then, with eventual educational requirements being equal, should more be asked of the man who prescribes spectacles?

"In passing, the two-year optometrical course at Columbia prompts the question: How many eye-specialists in the medical profession entered practice with the advantage of two full years of university education, instruction and experience in the art and science of refraction alone?"

CHAPTER VII

Governors' Approval of Optometry Laws

The beneficial results of legalizing and regulating the practice of optometry have been everywhere so plainly apparent, in every respect, but especially in the protection of the public from incompetent practitioners and in the conservation of human vision, that only those who are wilfully blind could fail to see them. In order to crystallize these results, and give them expression through the representative voice of the people, a request was made upon the executives of various States, in which optometry laws had been in force and effect for some years, for a statement on the subject. The statements thus elicited are given below. Some of the State Governors here represented are the same executives who approved and signed the optometry bills in their respective States; others are successors of the signing executives. But all are unanimous in their testimony to the great benefits accruing from the administration of optometry laws. Not a single executive, as far as known, has ever given contrary testimony.

STATE OF NEW YORK

Executive Chamber

Albany, December 11, 1916.

Mr. Albert Myer, Secretary,
American Optical Association,
Albert Lea, Minn.

My Dear Sir:

Your letter of the 24th of October, requesting an expression from me as to the operation of the optometry law in this

State, was duly received and answer to the same has been delayed owing to pressure of other matters.

However, now I am glad to say that our law regulating the practice of optometry has been most beneficial in its results, in that it has stopped the sale of cheap and worthless glasses at high prices by irresponsible, itinerant vendors; it has restricted the fitting of glasses to oculists and refractionists and made them responsible under the law. It has directly caused the establishment of schools in which theoretical and scientific instruction is given to those who would become optometrists. Since the law was placed upon the statute books in 1908 there has been an aroused interest in the care of the eyes, especially of children in the public schools, and more careful attention to the care of the eyes of adults has resulted.

I have no doubt that directly and indirectly the optometry law has been a great agent in the conservation of public health and public comfort.

Yours very truly,
CHARLES S. WHITMAN,
Governor of New York.

EXECUTIVE DEPARTMENT

State of New Jersey

October thirtieth, 1916.

Our law regulating the practice of optometry, was passed in 1914. I believe it has driven out fakirs, raised the standard of the profession and given general satisfaction. There has been no suggestion of its repeal or even modification.

Very truly yours,

(Signed)

JAMES F. FIELDER,
Governor of New Jersey.

EXECUTIVE DEPARTMENT

State of Oregon

I am glad that Oregon is one of the thirty-eight states which has statutory regulation of Optometry. It seems to me

that this is a most vital field for state supervision, and I believe that the Oregon Law is giving very general satisfaction, and is tending towards the best upbuilding of the profession.

(Signed)

JAMES WITHYCOMBE,
Governor of Oregon.

EXECUTIVE CHAMBER

State of Florida

Oct. 30th, 1916.

Relying to your communication of the 27th, instant, in which you desire to have an expression from me regarding the operation of the Optometry law in this State, I beg to advise that I have no specific knowledge as to its operation here, but in a general way I am impressed that the law is satisfactory.

Yours very truly,

(Signed)

PARK TRAMMELL,
Governor of Florida.

EXECUTIVE OFFICE

State of Arizona

November 4, 1916.

In compliance with the request made in your letter of the 26th ultimo, I readily assure you that in my opinion, the laws governing the practice of Optometry in Arizona are necessary for the proper protection of the public, and should, under no circumstances, be dispensed with.

The statute, as at present in force, maintains a higher standard of Optometry practice than would otherwise be possible. I am heartily in favor of such laws and believe that every State in the Union should have a similar statute.

A uniform Optometry law in all the States of the Union would, doubtless, be an excellent thing.

Sincerely yours,

(Signed)

GEO. W. P. HUNT,
Governor of Arizona.

EXECUTIVE CHAMBER
State of Tennessee

October 31, 1916.

My attention has been called to your letter of the 25th inst., asking for an expression from me in regard to the optometry law of Tennessee, and in reply beg to say that the General Assembly of 1915 passed a new Act upon this subject, which I am informed embodies the best provisions of the laws of other states upon this question and the administration of the office is in the hands of a competent and vigilant Board, from whose administration it is expected that the State will receive that degree of protection that it justly deserves in this line.

In my opinion, the practice of optometry is one that should be well and properly safeguarded, inasmuch as it affects the comfort and welfare of a great many people. Our law in Tennessee and the present Board of Optometry are giving the protection desired at this time.

(Signed) Very respectfully,
TOM C. RYE,
Governor of Tennessee.

OFFICE OF THE GOVERNOR

State of Washington

October 28th, 1916.

Replying to your inquiry of the 24th instant, I beg to say that all the information I have indicates that good results have followed in the State of Washington as a result of the enactment and placing into operation of the law creating and empowering the State Board of Examiners of Optometry.

Yours very truly,

(Signed)

ERNEST LISTER,
Governor of Washington.

OFFICE OF THE GOVERNOR
State of North Dakota

Bismarck, October 23, 1916.

I have your letter of October 20th with reference to the working of the Optometry law in North Dakota. I might say that I introduced this law myself some years ago when a member of the State Senate, and the law has now been in force and operating for a number of years. It is working well and has been a real benefit to the people of the State in barring and keeping out of North Dakota those who are not qualified to fit glasses to the eyes of people needing them, and in putting the business into the hands of those qualified to conduct it. Personally, I feel that the law in every way has been a complete success.

Sincerely,

(Signed)

LBH-G

L. B. HANNA,

Governor of N. Dakota.

EXECUTIVE DEPARTMENT

The State of New York

Albany, May 21, 1908.

"Objections have been urged to giving legal recognition to the practice in question; but the fact remains that the practice exists and will continue, and unquestionably it forms a proper subject for legislation. I therefore approve the bill."

CHARLES E. HUGHES, Governor.

EXECUTIVE DEPARTMENT

State of Tennessee

Nashville, April 29, 1910.

"Tennessee Optometry law has proven a complete success."

MALCOLM R. PATTERSON, Governor.

EXECUTIVE DEPARTMENT

State of Montana

Helena, April 14, 1908.

"I believe it to be a step in the right direction."

EDWIN L. NORRIS, Governor.

EXECUTIVE DEPARTMENT

State of California

Sacramento, Feb. 10, 1910.

"The California Optometry laws are accomplishing great good in our State and are proving very satisfactory."

J. N. GILLETTE, Governor.

EXECUTIVE DEPARTMENT

State of Minnesota

St. Paul, May 1, 1908.

"I will say that the law has been of service to the people of the state. I unreservedly believe that the board has performed a great service in this: that it has prevented many persons from practicing Optometry who were not competent, and it has thereby protected the general public."

JOHN A. JOHNSON, Governor.

EXECUTIVE DEPARTMENT

State of Minnesota

St. Paul, February 11, 1910.

"The Optometry law in this State, passed a few years ago, has proven of great value. The board as constituted under it is made up of representative men in that profession and its usefulness has seemed to grow from year to year."

ADOLPH O. EBERHARDT, Governor.

EXECUTIVE DEPARTMENT

State of Michigan

Lansing, February 7, 1910.

"The bill passed both houses by good substantial majorities. After giving the matter careful consideration I approved the bill."

FRED M. WARNER, Governor.

EXECUTIVE DEPARTMENT

State of Vermont

Newport, February 8, 1910.

"My idea was that the law would better present conditions and I am sure it has done so."

G. H. PROUTY, Governor.

EXECUTIVE DEPARTMENT

State of Idaho

Boise, Feb. 9, 1910.

"The law has had a very beneficial effect in our State and we have succeeded in eliminating the quacks entirely. I sincerely trust that every state will see fit to place a statute of this kind upon its books."

J. H. BRADY, Governor.

EXECUTIVE DEPARTMENT

State of Iowa

October 25th, 1916.

Answering your letter with reference to the operation of the Optometry Law in Iowa, I have to say that I think it has proved of very considerable value in its operation.

Very truly yours,

(Signed)

G. W. CLARKE,
Governor of Iowa.

EXECUTIVE DEPARTMENT
State of Minnesota

St. Paul, June 7, 1916.

Mr. Albert Myer,
Secretary State Board of Optometry,
Albert Lea, Minn.

Dear Sir:—

The effect of the law regulating Optometry in Minnesota has been to bring more scientific knowledge to the profession. In the old days glasses were sold by peddlers and hawkers who went through the country disposing of their wares without regard to the needs of the buyers, but under the operation of the new law no such traffic is permitted.

The Board of this State has been given considerable power in raising the requirements for preliminary study with the result that more responsible men are entering the profession. Minnesota was the first state to pass a law regulating optometry and thirty-seven states of our Union have now followed her example.

Very truly,

J. A. A. BURNQUIST, Governor.

(NOTE—The operation of the Optometry Law in Minnesota has been approved by every executive from Governor S. R. Van Sant, who signed the first bill, to Hon. J. A. A. Burnquist, the present executive.)

EXECUTIVE DEPARTMENT
State of Vermont

November 3, 1916.

Your letter was received by Governor Gates and he has directed me to acknowledge the same and say to you that he has hearty approval for laws regulating the practice of Optometry and also the regulation of the practice of all kinds of professional sciences.

Yours very truly,

(Signed) BENJ. GATES,
Secretary of Civil and Military Affairs.

EXECUTIVE CHAMBER

State of Nevada

October 27th, 1916.

In response to your letter of the 23rd instant, I beg to advise you that Nevada has an optometry law which is doubtless protecting the public from many abuses.

The Board of Optometry here is composed of reliable optometrists who have been painstaking in their efforts to see that persons not properly qualified are not permitted to practice in this State to the injury of innocent patrons.

Very truly yours,

(Signed)

EDB-BC

EMMET D. BOYLE,

Governor of Nevada.

EXECUTIVE DEPARTMENT

State of Maryland

November 10, 1916.

I have your letter of the 23rd, ultimo, requesting an expression from me as to the operation of the Optometry law in Maryland, and in reply beg to say that the results so far, from this law, have been very satisfactory and beneficial. The law has abolished the practice of fitting glasses by fakirs at fairs throughout the State, and it has raised the standard generally and is bringing a better class of men into the business.

Yours truly,

(Signed)

EMERSON C. HARRINGTON,

Governor of Maryland.

CHAPTER VIII

Optometry's Legal Decisions

It was not to be supposed that optometry would be left in quiet and undisturbed enjoyment of the title and territory it had won. Hardly was the ink dry upon the optometry laws enacted in some of the States, and others were still without such laws, when their constitutionality was attacked, and determined efforts made to overthrow them. The newly legalized profession had antagonism from two sides: on the one side, from the medical profession, instigated by its eye-specialists, whose resentment still burned and who still hoped to gain their point; and on the other side, from the guerilla practitioners of refraction against whom optometric regulation was specifically aimed, who did not want to be regulated, and who naturally did not take kindly to the requirements and restrictions imposed by optometry laws.

From each of these groups, in their relations with optometry, litigation arose which culminated in an appeal to the Supreme Court of the State, and an attempt to have the optometry practice act declared unconstitutional,—a result which, if consummated, would undoubtedly have served as a precedent for a similar catastrophe in every other State where an optometry law was in force, and effectually have squelched all efforts to obtain optometry legislation in the remaining States.

But an appeal to a Supreme Court is a two-edged weapon. "They that take the sword shall perish by the sword." What these opponents of optometry, in each case, failed to take into account,—probably because as yet they did not believe it,—was that optometry was in the right. And, to the honor of America's higher courts of equity be it said, right rarely fails of vindication at their hands. Instead of resulting in the overthrow of all that

optometry had built up, these Court tests established every article of its charter, and made it forever secure, unassailable, beyond the reach of challenge or attack.

Curiously enough, the first such suit was brought, and decision rendered, in Illinois, before that State had an optometry law at all. But there can be little question of its direct relationship, both in motive and in effect, to the movement which was then well under way, and already successful in a few of the States, for legalization of the optometric profession.

The suit in question was instituted in the name of The People of Illinois, at the instigation of the State Board of Health, against one Charles L. Smith, of Peoria, Ill., who, it was alleged, was practising refraction in violation of the medical practice act. Losing his case in the trial court, defendant took an appeal to the Appellate Court, which reversed the finding of the lower court. The State Board of Health then appealed the case to the Supreme Court of Illinois, which, in an opinion filed February 17, 1904, delivered by Mr. Justice Wilkin, not only affirmed the judgment of the Appellate Court, but, in accordance with its custom, set forth in clear detail the grounds of its decision.

That the record might lack nothing of completeness, the Supreme Court first remanded the case to the Appellate Court, with directions to incorporate in its judgment of reversal a statement of facts, in compliance with Section 88 of the practice act; and this statement of facts was incorporated in the Supreme Court opinion. It is as follows:

"We find that appellant was engaged in the business of traveling optician; that he went from place to place in this State, including Peoria, where the acts in question were performed; that he fitted spectacles to persons of defective sight, first ascertaining by tests the kind of lens required by his customer, then procuring the glasses to be ground accordingly and placed in a frame and delivered to his customers, and receiving payment therefor; that he advertised himself as 'the famous Chicago eye expert, and in such advertisements he invited persons afflicted with blurring, dizziness, neuralgia, headaches, spots before the eyes, inflammation, granulation, winking, trembling spells, cataract, burning and smarting of the eyes, and various nervous brain affections, to call upon him; that

these advertisements stated that he did not give medical or surgical treatment; that in these advertisements he stated that his glasses, fitted and ground by his method, benefited his patrons, and had cured headaches, blurring, itching, and burning of the eyes, etc.

"We find that appellant's glasses relieved such troubles while they were used, but did not cure them. We find that appellant had no license from the State Board of Health. We find that appellant did not practise medicine or surgery. We further find that appellant did not treat, or profess to treat, operate on, or prescribe for, any physical ailment or any physical injury to, or deformity of, another, except in the manner and to the extent as aforesaid. We find that the foregoing were the acts for which appellee sought to recover, and recovered, from appellant in this case the penalty prescribed by the act entitled 'An act to regulate the practice of medicine in the State of Illinois, and to repeal an act named herein,' in force July 1, 1899. We hold that these facts did not give appellee a cause of action against appellant."

The case, from the standpoint of facts and practice, could hardly have been stated in more bald and explicit terms if optometry itself had drawn up the most extravagant schedule of its claims that it could devise. Indeed, as will be seen, the situation involved some methods of practice on the part of the plaintiff which legalized optometry has since discountenanced and prohibited. On this extreme statement of facts, the Supreme Court of Illinois rendered the following decision:

"The finding of the Appellate Court is, that all the defendant did was to fit spectacles to the eyes of persons of defective vision and sell them to such persons. By so doing he did not treat, operate upon, or prescribe for, any physical ailment or injury or deformity of another, within the meaning of Section 7; nor did he, by advertising himself as an eye expert, and inviting persons afflicted with certain defects of vision to call upon him, profess to treat, operate upon, or prescribe for, any physical ailment or physical injury to or deformity of another, but in the same advertisement stated that he did not give medical or surgical treatment. All that he claimed by the advertisement was that glasses fitted and ground by his method benefited, and had cured, headaches, blurring, itching and burning of the eyes, etc. We also think it clear that he was not, under the facts, here found, an itinerant vendor of any drug, nostrum, ointment, or application of any kind intended for the treatment of disease or injury, nor did he, by writing or printing, or other method, profess to the public to cure or treat diseases or deformity by any drug, nostrum, or application, within the meaning of Section 8.

"It would be a strained construction of that section," concluded the Court, "to behold that the mere fitting of spectacles to the eyes of a person is an appliance intended for the treatment of disease or injury of another. As we have said, this statute is penal in its character, and must be strictly construed. It is a well known fact that headaches, dizziness, and other similar ailments often result from defective vision, which may be relieved by the use of spectacles; but it cannot be seriously contended that the person who sells such spectacles, or who tests the eyes and fits such glasses, practises medicine or surgery, or professes to cure or treat diseases or deformities thereby. While the statute under consideration is a wise and humane regulation for the protection of the public, and should be rigidly enforced, the construction here contended for could have no other effect than to bring it into disrepute.

"We think, on the facts recited in the judgment below, the Appellate Court ruled properly in holding that the evidence did not warrant a conviction. Its judgment will therefore be affirmed."

Here, again, the position of optometry could hardly have been more clearly or conclusively stated if optometry herself had written the decision. Here, in a few concise and incisive words, optometry's claims, in their entirety, are crystallized and clothed with the force and effect of the highest tribunal of a sovereign State. And this, be it remembered, before any legislation had even been sought, let alone obtained, in that State, for the legalizing of optometry as an independent profession; although, as stated, some other States had secured optometry practice acts, and a more or less nation-wide movement was under way for such legislation.

It may be said, in passing, that when Illinois optometrists later succeeded in passing an optometry bill through the two houses of the legislature, and it came up to the executive for signature, Governor Dunne, himself a lifelong occupant of the judicial bench, was powerfully influenced by this opinion of the Supreme Court in his attitude toward the bill. It was, probably, the strongest single factor which decided him in affixing his signature.

But it is the decision of the Court of Common Pleas of Pennsylvania, rendered in October 1914, that stands out as the most conspicuous landmark in optometry's progressive crusade for

emancipation and recognition. If the embodiment of her claims in the enactment of practice acts represented optometry's Declaration of Independence, the Pennsylvania decision may be well regarded as the cap-sheaf of optometry's *Magna Charta*.

The suit of which this famous decision was the culmination was the action of optometry itself, by Pennsylvania optometrists strongly supported by the American Optical Association. In 1911 a Board of Licensors was formed in Pennsylvania for the purpose of bringing the practice of medicine and similar callings under the jurisdiction of the State. In 1913 it was decided to amend this act so that it would include, under medicine, the regulation of ocular refraction. Optometry has already won several legal fights in which attempts had been made to construe optometry as the practice of medicine; and it foresaw that if the Pennsylvania amendment was passed, its previous victories would go for naught, so far, at least, as the State was concerned, and set a disastrous precedent for other States.

Optometry brought suit to enjoin the State from including its practice in the proposed amendment to the medical code; whereupon the Attorney-General of the State filed a demurrer, holding that, not the court, but the State Board of Licensors, had jurisdiction over the matter; and the issue was joined. It was probably the most dramatic and keenly waged legal fight in all of optometry's strenuous history. Each side sensed the far-reaching momentousness of the issues at stake. The world will never know,—not even this veracious history can relate,—the whole inner story of that memorable battle; the details of the strategy, the vigilance, the tireless energy, the indomitable resourcefulness, of the men who fought and won it for optometry. All that can be given here is a brief statement of the engagement and its outcome.

All the customary objections and arguments of the medical profession were adduced, with all the force and cogency that keen legal brains could lend them, and no point of vantage was overlooked. They will be found incorporated in the court's decision. One piece of testimony alone will be abstracted here,

because of its intense historical interest, and its elemental bearing on the early relation of optometry to medicine. It is the testimony of James Cook McAllister, of Philadelphia, who testified that his grandfather, an optician, taught the art of ocular refraction to the first Philadelphia oculists.

Q. What is your profession?

A. Optician.

Q. How long have you been engaged in that profession?

A. Forty-three years.

Q. You are of the house of McAllister that has been an optician house since some time in 1900?

A. Yes.

Q. Do you happen to know who was the first man that measured the first pair of eyes in Pennsylvania for glasses and fitted them?

A. My grandfather, John McAllister, Jr.

Q. Do you happen to know the first man who taught the oculists in Philadelphia how to measure eyes?

A. My father, William Young McAllister, and James W. Queen.

Q. That is to your personal knowledge, you were in the store at that time?

A. Yes.

Q. Who were the first oculists to your knowledge in Philadelphia?

A. Peter Keyser, George Strawbridge, Richard Levis.

Q. After they had acquired their degree of doctor of medicine, to whom did they go to learn refracting?

A. They got their knowledge of lenses and the use of the test case from my father principally, and other members went to James W. Queen. Those three men came to my father.

Q. Then the profession of oculist came in as a separate profession, or as a specialty in medical work, about when to your personal knowledge?

A. In the 70's early 70's.

Q. And the work of what is called the optometrists was done up to that time entirely by whom?

A. By the opticians.

The decision in this notable case, which was handed down by Judge Willson, on October 10, 1914, is given below in full, because of its great importance to, and its far-reaching influence upon, the cause of optometry and the advancement of the care of human vision:

The Decision

"The plaintiffs have been for many years engaged in carrying on business in the city of Philadelphia as optometrists. This business or profession is one in which those engaged in it, by means of examination of the eyes of patients, sometimes by the aid of instruments of various sorts, endeavor to ascertain the range of vision, visual powers in general, the extent of the visual field, the refractive state or condition of the eye, and the position and movements of the eyeball. They also adjust and make lenses to overcome defects of vision.

"As we understand the facts of the case there is no essential difference, as to the nature of what is done by optometrists, between the plaintiffs and the defendants.

"It is well established by the proofs that optometrists do not use medicines in the performance of their work, nor do they resort to anything of the nature of surgical treatment of eyes.

"The defendants, by their regulations, adopted on the twenty-fourth of July, 1914, have defined optometry in the following terms: 'Optometry is hereby defined to be the employment of any means other than the use of drugs for the measurement of the powers of vision and the adaptation of the lenses for the correction and aid thereof.'

"This definition does not radically differ from the plaintiffs' own definition of the nature of their work, as set forth in paragraph 3 of the bill filed. We have, therefore, substantially adopted that definition as fully expressing what we regard to be the nature of the plaintiffs' work.

"It appears from the proofs that the business or profession of optometry is one of ancient standing. Until a comparatively recent date a large part of that which is done by optometrists was exclusively within their province and was not covered in practice by the efforts of the physician or surgeon. Within the last quarter of a century, or thereabouts, it appears from the proofs that, among those who are engaged in the making of lenses to correct or cure defects in eyes, there has arisen a classification or division, whereby some who make lenses confine themselves entirely to the work of

making them in accordance with prescriptions given by physicians or oculists. These call themselves, or are known as, 'opticians,' others, who still manufacture the lenses, either according to their own judgment or the prescriptions of physicians, do not confine themselves to the making of lenses, but also examine the eyes for the purpose of ascertaining whether there are such defects visible as can be corrected by the application of lenses. This class has taken the name of 'optometrists,' and that is the name by which they are generally known.

"Those who practice under the latter title are many in number and they are recognized in many States of the Union as a class by themselves, and regulated by statute.

The Defendant Board

"In the year 1911 there was enacted in this State a statute which created a 'Bureau of Medical Education and Licensure as a bureau of the Department of Public Instruction.' The preamble to the statute sets forth the purposes which the Legislature had in view in making the enactment, and it reads as follows:

"Whereas, The safety of the citizens of this Commonwealth is endangered by incompetent physicians and surgeons, and due regard for public health and preservation of human life demands that only competent physicians and surgeons shall be permitted to practice their profession."

"In the section which follows the preamble it was enacted, 'That on and after January first, nineteen hundred and twelve, it shall not be lawful for any person in the State of Pennsylvania to engage in the practice of medicine or surgery or to hold himself or herself forth as a practitioner in medicine or surgery, or assume the title of doctor of medicine or surgery, or doctor of any specific disease, or diagnose diseases, or to treat diseases by the use of medicine or surgery excepting those hereinafter exempted, unless he or she has first fulfilled the requirements of this act, and received a certificate of licensure from the Bureau of Medical Education and Licensure, created by this act, which certificate of licensure shall be properly recorded in the office of the superintendent of the Bureau of Public Instruction, at Harrisburg.'

"The same section further provided that any person willfully violating the provisions of the section, should, on conviction, be deemed guilty of a misdemeanor and subject to a fine and imprisonment, or both, at the discretion of the court. It is not necessary for the purposes of the case to state more fully the penal provisions.

"By the Act of Assembly, approved July 25, A. D. 1913, the Act of 1911 was amended in certain respects. The particular in which the amendments have the element bearing upon the present case is the change of the title of the act. That title, as amended by the later of the two statutes, reads as follows: 'An act relating to the right to practice medicine and surgery

in the Commonwealth of Pennsylvania; and providing a Bureau of Medical Education and Licensure as a bureau of the Department of Public Instruction; and means and methods whereby the right to practice medicine and surgery and any of its branches may be obtained, and exemptions therefrom; and providing for an appropriation to carry out the provision of said act; and providing for revocation and suspension of licenses by said bureau; and providing penalties for violation thereof, and repealing all acts or parts of acts inconsistent therewith.' The title as so amended must be regarded as the title of the original act, from the time when the Act of 1913 became operative.

Would Regulate Optometrists

"In pursuance of the powers which the defendants, who constitute the Bureau of Medical Education and Licensure, as it was created and empowered by the said enactments, at a meeting of the board held on the 24th of July, 1914, undertook by regulations, which were then adopted, to bring the optometrists of the Commonwealth within the class of persons who were required by the Acts of Assembly above referred to to obtain a license from the said board before they could lawfully engage in the practice of their business or profession.

"These regulations provided that those persons who had been engaged in the practice of optometry within the State for more than two years prior to July 24, 1913, and were of good moral character, should receive a license without examination, and that all other persons practicing optometry within the State should be subjected to an examination to be held at a date to be fixed thereafter by the board.

"It was further provided that applications to practice optometry under the regulations referred to must be made at the office of the bureau in Harrisburg, on or before the first of November, nineteen hundred and fourteen, and after January first, nineteen hundred and fifteen, it would be unlawful for any person to practice optometry within the State, or to hold himself out as an optometrist, without having first qualified under certain prescribed tests, which were contained in the regulations adopted by the board. The license fee fixed by the board was the sum of \$25.

"Viewing the case as we do, we do not regard it as necessary to enter more fully into a statement or recital of the regulations of the board in the premises.

"The plaintiffs have filed the bill in this case for the purpose of enjoining the defendants from carrying into effect the regulations before referred to and from adopting any other regulations or plans affecting such persons as desire to practice optometry within the State.

"We are also asked to decide that the Act of 1911, as amended by the Act of 1913, is unconstitutional, in so far as it attempts to regulate the

practice of optometry, if it shall be held that that was covered by the scope of the statute.

"We are also asked to decide that the two Acts of Assembly referred to do not purport to, and do not, in fact, regulate the practice of optometry in any manner whatsoever.

"A considerable number of persons who assert that they are practicing optometrists within the State have through their counsel, in writing, expressed their desire to join as parties plaintiff in the present case.

"Before we take up for consideration what we regard as the principal and most substantial questions in the case, we may as well dispose of two preliminary points which have been raised by counsel.

The Court's Authority

"There are many cases which might be cited to sustain the position which we have taken in this matter, but we think it only necessary to refer to the decision in Mahoning and Shenango Railway and Light Company *vs.* New Castle, 233 Pennsylvania State Reports, 413. We do not understand that the ruling, thus expressly made by the Supreme Court in that case, was intended to be modified in any degree by the ruling of the same court in Pennsylvania Railroad Company, Appellant, *vs.* Ewing, 241 Pennsylvania State Reports, 581.

"Another point which we will treat at the present time is one which is taken on behalf of the plaintiffs, and that is that the action of the defendants in undertaking to classify optometry as within the meaning of the statutes before referred to, and in prescribing regulations of the same, the board was usurping the powers and functions of the Legislature. We do not regard this point as well taken.

"The Acts of Assembly in question did not attempt to classify any particular branch of medicine or surgery, or any branch of medicine or surgery, or any branch of treatment of diseases or deformities. They simply authorized a board to provide for the registration of all persons who came within the prohibition of the statute. That was all that the board attempted to do in the matters involved in the present case. If they were right in regarding optometrists as engaged in the practice of medicine or surgery or doing anything else within the acts prohibited, then we do not see why it was not within the scope of their powers to impose reasonable regulations, and we cannot say that if the optometrists are subject to control by the board, the regulations imposed are unreasonable.

Is Optometry Medicine?

"The first is that taken in behalf of the defendants, to the effect that, as a Court of Equity, we cannot take jurisdiction of the case because of the penal provisions of the statute; in other words, that a court will not en-

join against a criminal prosecution of those who are charged with having committed offenses under the law. It may be conceded without any hesitation that under ordinary circumstances, where a single individual desires to obtain a decree from a court of equity to enjoin a proceeding against him in a court of criminal jurisdiction, relief must be denied to him. We regard it as well settled, so well settled as not to require a citation of authorities upon the subject, that, except in cases where a multiplicity of suits would constitute reason for an exception, or where an initial fundamental question of constitutionality or legal right is involved in the case, a court of equity will not intervene, but leave the plaintiff to have his rights determined in the criminal proceeding.

"In the present case, however, we have both the elements of a multitude of cases and interests and a serious question of constitutional right and privilege, which the plaintiffs, as it seems to us, have a right to have determined in the first instance, and if their views of their rights are sustained, to be relieved of the annoyance, expense and the possible prosecution, which might otherwise come to them, if their case cannot now be heard and decided. Their right to practice their occupation is a property right and entitled to protection, unless it is regulated and controlled in a lawful manner.

"We are able now to take up what we regard as the serious question or questions of the case. It need not be said that the defendants ought to be encouraged in every proper effort to promote the health of the people in the Commonwealth. Unquestionably, such efforts on their part are of prime importance and nothing but necessity should be permitted to stand in the way of their proper discharge of such duties. We have no question that in the matter now in hand the board acted in the utmost good faith and under full conviction that they were acting fully within the powers conferred upon them by statute.

"It is incumbent, however, upon the court, when a question of the present sort is submitted to it, not only to keep in mind the advantages which might come to the public from a desired interpretation of a statute, but also to regard the right of others, whose interests may be affected by action taken by such a public body as the defendants constitute.

"The serious and substantial question which seems to us to arise in the case under consideration is whether or not in any fair, just, or proper sense it can be said that the plaintiffs and other optometrists of the Commonwealth were embraced within the meaning or application of the Acts of Assembly before referred to.

"In the first place, does the title, as amended by the Act of 1913, cover the plaintiffs, or give any reasonable or fair notice to anybody that they were or could be embraced within the purposes of the legislation contemplated? Every lawyer now knows that, while the title to an act need not

be index to every provision in it, it is necessary in order that the act may be valid, that provisions in a statute, the constitutionality of which is challenged, shall be covered without strained or unnatural construction by the general purposes which are set forth in the title. Can it be said that men who are engaged in a business of recognized and ancient standing, such as optometrists, would have been likely, upon being made aware that a bill was pending in the Legislature, having such a title as that which has been cited and quoted, to regard it as having any possible application to themselves? If not, then, they would have been deprived of the opportunity to protest or make suggestions which, as we understand the case, the constitutional requirement as to the nature of a title of a statute was intended to provide.

Not Medical Practitioners

"These men are not practising medicine in a popular sense of the term. They give and prescribe no medicines. Nobody pretends that they ever resort to surgery. Why, then, supposing one or more of these optometrists had been informed of the pendency of such a bill in the Legislature, would he reasonably or naturally have regarded the bill as intended to affect people engaged in the same business that he was conducting?

"Passing the point just considered, however, can it be said with propriety that the plaintiffs and others engaged in the same occupation are engaged in the practice of medicine and surgery, or hold themselves forth as practitioners in medicine and surgery? Nobody asserts that the plaintiffs or any others like them assume the title of doctor of medicine and surgery or doctor of any specific disease, or that they treat diseases by the use of medicine and surgery. As we understand the position of the defendants it is that the plaintiffs and others like them take certain steps and resort to certain methods, which specialists who treat diseases and defects of the eye also resort to.

"It is likewise claimed, in support of the defendants' position, that there may be diseases which the optometrist, by such processes of examination as he adopts, may not ascertain, and that for the reason he may prescribe glasses where conditions of the patient require other treatment, and that the eyes of the patient may be thereby seriously affected and damaged.

"We cannot regard the fact that the work done by the eye specialist physician and that done by the optometrist, to a certain limited extent, lap over each other, constitutes the optometrist a practitioner in medicine. Such work on the part of the optometrist was done by him perhaps and probably long before the eye specialist among physicians had either the knowledge or the skill to do the work which is now done by both physician and optometrist. It is to be supposed that reputable physicians, as a part

of their practice, at times resort to the use of electricity and massage as a part of their method of treating diseases. Would it be a fair application of the statutes in question to say that every masseur and every electrician was practising medicine because he applied massage or used electrical apparatus in the same way that physicians do or have done?

"So far as the alleged danger to patients from the application of glasses or lenses, upon an examination which did not disclose a hidden disease, a point urged with great force on behalf of the defendants, it seems to us that such a consideration throws no light upon the meaning of the statutes or their bearing upon the case in hand. It might constitute a sufficient reason for the Legislature to regulate the practice of optometry by special enactments, or, by suitable enactments or amendments to bring optometrists within the regulative control of the defendants making up the board entrusted with the supervision over such matters as are involved in the present case.

Diagnosing Diseases

"A good deal has been made in the case of the prohibition in the first section of the Act of 1911, applicable to persons who 'diagnose diseases.' It has been claimed that the plaintiffs and other optometrists do diagnose diseases. The proofs in the case are to the effect that optometrists, examining the eye of a patient, either with or without the aid of artificial means, in case they find that the interior of the eye is clouded and gives ground for suspicion that there is some disease of the eye, inform the patient that for his own protection and safety, he should consult a physician. We understand that under such circumstances the optometrists decline to furnish lenses for the patient. Now, is that diagnosing diseases?

"We have had a great variety of definitions given, from various lexicographers and from eminent physicians. The word, etymologically and in its general interpretation, signifies, as we understand it, a discrimination, a passing of judgment, as to physical conditions. In a sense, we suppose it may be said that a mother having a child giving signs of whooping cough or some febrile condition, passes judgment upon the case. Is that diagnosis within the meaning of the statute? If a barber finds that the man in his chair shows signs of a diseased scalp or skin, does he diagnose the disease in reaching such a judgment? We think not. We think that a fair and usual construction and interpretation of the words 'diagnose diseases,' such as we ought to give to them in determining the meaning of the Acts of Assembly in question, is that the mental act involved in the matter of diagnosis should be something more than the mere determination that there were indications of disease.

The Optometrist and Disease

"The optometrist does not undertake to determine what disease, if any,

exists in an eye which he examines. According to the proofs, it is sufficient reason for a reference of the case to a physician, if there is that which gives him reasonable ground for suspecting that a disease exists. It seems to us that it would be applying a severe rule and stretching language beyond its natural force if we should say that such action on the part of an optometrist is 'diagnosing diseases.' The use of the plural noun seems to us to indicate what otherwise appears to us to be a proper construction, that to 'diagnose diseases' means to distinguish, discriminate, between two or more diseases. If, however, that is too narrow a view to take of the case, the quoted phrase must involve the act of determining what disease exists. This the optometrist does not attempt to do.

"It might be said with a great deal of force that the evil which the Legislature intended to provide against was the incompetent physicians and surgeons, those who held themselves out to the public as physicians and surgeons, either generally or in a limited sphere, should be subjected to examination by the Medical Board and to the necessity of obtaining a license to practice medicine and surgery. The enacting clauses of the statute must be interpreted, under familiar rules of construction, with reference to the purposes of the statute as set forth in the preamble as well as in the title. Undoubtedly, whatever would naturally, legitimately, fall within the scope of that which is described in these parts of the statutes, could properly be regarded as covered by the terms of the enactment. Applying this standard, it seems to us that the scope of the defendants' powers is not large enough to embrace the conduct and the occupation of the plaintiffs.

Not Covered by the Act

"In the present case it is our conclusion that the plaintiffs, and those engaged in the same occupation as themselves, are not covered by the provisions of the statutes, and that even if they were the Acts of Assembly, as far as they apply to the plaintiffs, are unconstitutional, because of an inadequate title, as hereinbefore set forth.

"This would be our judgment upon broad and general grounds, but we regard it as more imperatively our duty to adopt the foregoing interpretation of the statutes in question, for the reason that the statutes are penal in character and therefore to be strictly construed.

"The trial judge had the advantage of the presence of his colleague, Judge Audenried, at the trial of the case, and he fully concurs in the conclusions which are expressed above, and in the formal findings that follow. The general presentation of the case as it precedes those findings can only be regarded as a fuller statement of the views of the court upon the main questions involved in the case.

Facts and Conclusions of Law

"We answer the requests which have been submitted to us in behalf of the plaintiffs and the defendants as sufficiently expressive of our conclusions, both as to the facts and the law of the case.

"The plaintiffs have asked us in the following requests to find the facts in the case to be as embodied in their requests:

"1. That the plaintiffs, and many others in Pennsylvania, practice a profession known as 'optometry.'

"Answer: This request we answer in the affirmative. It is a fact which is at the basis of both the plaintiffs' and defendants' sides of the case in the controversy before us.

"2. That optometry is properly defined to be 'the employment of any means other than the use of drugs, for the measurement of the powers of vision and the adaptation of lenses for the correction and aid thereof;' or is more fully defined as 'the measurement of the range of vision; of the visual powers in general; of the extent of the visual field; of the accommodative and refractive states of the eye, and of the position and movements of the eyeball.' (See paragraph 10 of Bill, where in the regulations of the bureau the first definition is given; see Century Dictionary, title 'Optometry,' for the second definition.)

"Answer: We affirm this request as correct in view of the proofs which have been submitted to us.

"3. The practitioners of optometry do not examine the eye by the use of mydriatics or drops to enlarge the pupil of the same.

"Answer: This request is affirmed. The proofs in the case have not exhibited any reason to believe any practitioners of optometry use mydriatics or drops in the examination of the eye, and the proof on the part of the plaintiff is to the effect that such means are not used in the examination of eyes.

"4. That optometrists do not habitually or generally use the title of 'Doctor,' and that no reputable practitioner of optometry holds himself out as, or uses the title of, 'Doctor of Medicine,' or 'Doctor of Surgery,' or 'Doctor of Medicine and Surgery.'

"Answer: This request we also affirm. There is no proof whatever that any optometrist holds himself out or uses the title of 'Doctor of Medicine,' or 'Doctor of Surgery,' or 'Doctor of Medicine and Surgery.' It is doubtless true that some, a few, of those who practice optometry in the State of Pennsylvania, call themselves 'Doctor' or affix to their names the letters 'D. O.,' a term of description which seems to be authorized under the statutes of some States.

"5. That the great body of optometrists do not pretend to diagnose, treat and cure diseases through the use of mechanical processes or otherwise.

"Answer: This request we affirm. There is no evidence in the case to the contrary.

"6. That the practice of optometry does not include 'differential diagnosis' as the said word is used in medicine and surgery.

"Answer: We affirm this request as correct. In other words, there is no evidence before us which would warrant us in reaching the conclusion that optometrists undertake either to reach a 'differential diagnosis' as between diseases, or to express any judgment to their patients as to such diseases, or to treat their patients on the basis of the difference between diseases.

"7. That errors of refraction in the human eye, due to an unusual shortness or depth of the eyeball, or unusual curvatures of the lenses of the eye, do not constitute 'disease.'

"Answer: We affirm the request as stated to us, with this modification, however, that if the conditions of the eyeball or of the lenses of the eye, as stated in the request, were the result of some disease affecting the eye, or parts of the eye, then the errors of refraction might, in our judgment, be regarded as the result of a disease.

"8. That errors of refraction due to improper balancing of the eye muscles do not constitute 'disease.'

"Answer: We make the same reply to this request as in the case of the request immediately preceding it.

"9. That the suspicion on the part of a layman, which an optometrist is, so far as medical practice is concerned, and the refusal to fit lenses, and the reference of the customer to a medical practitioner, does not constitute a 'diagnosis.'

"Answer: We affirm this request. More particularly we say that, in our judgment, such conduct on the part of the optometrist does not constitute diagnosing diseases, such as is mentioned in the first section of the Act of 1911.

"10. That the suspicion on the part of a layman, which an optometrist is, so far as medical practice is concerned, and the refusal to fit lenses, and the reference of the customer to a medical practitioner, does not constitute 'diagnosing diseases.'

"Answer: We affirm this request as correct.

"11. That the practice of optometry does not constitute person so practising it a 'person pretending to a knowledge of any branch or branches of medicine or surgery.' (See Section 6 of the Act of June 3, 1911, as amended by Act of July 25, 1913.)

"Answer: We affirm this request.

"We are also asked on behalf of the plaintiffs to state the following:

"1. That equity has jurisdiction over the subject matter of the bill filed in this case.

"Answer: We answer this request in the affirmative. We are of opinion, under the ruling of the Supreme Court of our State, in *Mahoning and Shenango Railway and Light Company vs. New Castle*, 233 Pennsylvania State Reports, 413, and by reason of many other decisions to the same effect, that this court has jurisdiction over the subject matter of the bill filed in this case, and that the fact that the statute is penal in its character and provides for a criminal prosecution of those who offend against the provisions of the statute, does not place it out of the jurisdiction of the court. The multiplicity of cases to be affected and the existence of a serious constitutional question, affecting the right of the plaintiffs to follow their profession or occupation, constitute, in our judgment, a sufficient reason for the court to take jurisdiction of the case.

"In this connection it may be said that it is entirely within the power of the defendants, in case any optometrist or any other person shall practice medicine and surgery or hold himself out as practising medicine or surgery, either generally or in a restricted degree, without having obtained a license so to do, to cause the arrest of any such person and bring him to trial in the criminal court, in case a grand jury shall find a true bill against him.

"2. That upon the averments of the bill a proper case for equitable relief is made out.

"Answer: We affirm this request as it is presented.

"3. That the plaintiffs' proofs sustain the averments of the bill, and that an injunction should be granted restraining the defendants from enforcing the regulations adopted at their meeting held July 24, 1914, as set forth in paragraph 10 of the bill, and from adopting any other regulations or plans affecting the plaintiffs or those persons practising or desiring to practice optometry within the State of Pennsylvania.

"Answer: In view of the findings of fact which precede these findings of law, we affirm this request.

"4. That the Act of June 3, 1911, as amended by the Act of July 25, 1913, is unconstitutional and void in so far as it attempts to regulate the practice of optometry.

"Answer: We conclude that the Act referred to, as amended, is unconstitutional and void, in so far as an attempt is made to apply it to the practice of optometry.

"5. That the Act of June 3, 1911, as amended by the Act of July 25, 1913, does not purport to, and does not in fact, regulate the practice of optometry in any manner whatsoever.

"Answer: We affirm this request as it is presented to us. We are of the opinion that nothing in either Act, by a fair or natural or proper construction, can be made to bring the profession or occupation of the plaintiffs within the prohibition of the statutes.

"6. That the defendants should pay the costs of this proceeding.

"Answer: We affirm to this request.

"On behalf of the defendants we are requested to find the facts in accordance with the following requests:

"1. Optometrists hold themselves out, without qualification or reservation, as able to advise persons suffering from headache, dizziness, or defective vision, or other forms of eye trouble, whether their condition is due to disease of the eye requiring treatment by a physician, or merely to an abnormality in the shape of the eyeball which can be cured by the use of glasses, in which latter event they prescribe and furnish glasses for them, for profit.

"Answer: This request must be answered in the affirmative. At the same time the answer should be qualified by stating that, according to the proofs, optometrists do not advise their patients that they have any particular disease of the eye, but simply that in the judgment of the optometrist the eye shows such signs of disease as requires examination or treatment by a physician. If there is no reason to believe that such a condition exists, then the optometrist may consider himself at liberty to treat the case himself by the making of glasses which he considers as adapted to the particular emergencies of the patient.

"2. Optometrists hold themselves out as being able to do more than measure the powers of vision and adapt lenses for the correction and aid thereof. In addition, they profess to be able to determine if the condition of a patient will be cured by glasses or requires other treatment.

"Answer: We cannot answer this request in the affirmative as it is stated. It is doubtless true that optometrists do profess to be able to determine whether the condition of a patient's eye is such that it will be helped by the use of glasses or, because of a diseased state, it requires the treatment of a physician. We do not think that the proofs justify us in stating the case more strongly than that.

"3. Optometrists make an examination of the interior of the eye with the aid of various instruments and without qualification or reservation hold themselves out as able, through such examination, to determine for themselves and to advise their patients whether the latter's eyes are diseased or not.

"Answer: It is doubtless true that optometrists generally make the examination of the interior of the eye with the aid of various instruments and they do hold themselves out as able, by the means which they employ, to determine for themselves and to advise their patients whether the latter's eyes are diseased or not. We are unable to say that they do this without qualification or reservation and we have no reason, in view of the proofs, to believe that they undertake to advise their patients of the nature of any disease which they may find or suspect to exist in the eyes of patients.

"4. The practice of optometry consists of (a) An examination of the eye, with or without the use of instruments: (b) A determination whether the condition of the eye as disclosed by said examination indicates the existence of disease; and (c) The prescription and fitting of eyeglasses in cases where the optometrist decides that there is nothing in the condition of the eye which indicates that the source of the complaint is any disease.

"Answer: We affirm this request as substantially correct.

"5. Optometrists hold themselves out without qualification or reservation as able to, and do, advise their patients whether their condition is such that they should consult a physician, or is the result merely of an irregularity in the shape of an otherwise healthy eyeball which can be corrected by an optometrist through the prescription of proper glasses.

"Answer: We affirm this request.

"6. It is impossible to determine intelligently whether the condition of the prospective user of glasses requires treatment by a physician, or can be cured by the use of glasses, without being able to determine the presence of disease in the eye, and the presence of disease in the eye cannot be determined intelligently without some knowledge of anatomy, physiology, and pathology of the eye.

"Answer: We believe that this request is substantially correct. In other words, and to explain our meaning, we are satisfied by the proofs, that there are diseases of the human body which affect the eye and yet may not cause such a condition as would be apparent to an optometrist in the making of such examination as he does make, and that to enable him or any observer to determine with accuracy whether or not there is some subtle disease affecting the eye, he ought to possess some knowledge of anatomy, physiology, and pathology of the eye. All this may be true, however, without its being also true that the optometrist, in doing what he does, is engaged in the practice of medicine or that he diagnoses diseases. Such a state of affairs as the request sets forth might well lead the Legislature to adopt measures such as have been adopted in other States for the regulation of the practice of optometry. The need of such a measure or regulation, however, does not bring the plaintiffs within the grasp of the statutes in question, nor does it throw any light on the proper interpretation of the meaning or scope of those statutes.

"7. Without some knowledge of anatomy, physiology, and pathology of the eye, there is danger that an optometrist might overlook symptoms of disease visible to a trained observer, and decide that patients required only eyeglasses, when in fact they required treatment by a physician, and would be injured by relying on glasses.

"Answer: We believe that this request is sound, but the answer which was given to the last preceding request is applicable also to the present.

"8. There is a branch of medicine the function of which is to determine from an examination of the eye whether any symptoms of disease are present therein, other than such as can be remedied by the use of eyeglasses, and to prescribe eyeglasses in case there are no such symptoms of diseases.

"Answer: We affirm this request.

"9. Every element of the practice of optometry, except the manufacture of eyeglasses, is included within the practice of a branch of medicine known as ophthalmology.

"Answer: We affirm this request.

"We are also asked by the defendants to answer the following:

"1. The complainants have a full, adequate and complete remedy at law, and there is no jurisdiction in equity in this case.

"Answer: We decline so to find, for reasons which have already been given.

"2. Optometry is a branch of medicine.

"Answer: We decline so to find.

"3. The examination of eyes and the determination, from such examination, whether the eye indicates the presence of disease or not, constitutes diagnosis.

"Answer: We decline to find as requested. In other words, we decline to find that the processes referred to constitute diagnosing of disease within the meaning of the statutes in question.

"4. The diagnosis of disease is an essential element of the practice of optometry.

"Answer: We decline to affirm this point as far as it is applicable to the case in hand.

"5. Practitioners of optometry hold themselves forth as able 'to diagnose diseases' within the meaning of the acts of June 3, 1911, and July 25, 1913.

"Answer: We decline to affirm this request.

"6. The fact that optometrists make examinations with the use of instruments and without drugs does not prevent their work from being just as much a branch of medicine as if drugs were used instead of instruments.

"Answer: The facts stated would not prevent the work of optometrists from being a branch of medicine, provided, taking their work as a whole, they could properly be regarded as practising medicine.

"7. The regulations affecting the practice of optometry, made by the defendants, are authorized by and in conformity with the Acts of June 3, 1911, and July 25, 1913.

"Answer: We decline to affirm this request.

"8. The Acts of June 3, 1911, and July 25, 1913, are constitutional.

"Answer: The acts referred to are doubtless constitutional in many respects and applicable to many persons, but in our judgment they are not constitutional or valid, so far as to justify the claims of the defendants or their action in the matter of optometrists.

"9. The injunction prayed for by the complainants should be refused and their bill be dismissed.

"Answer: We decline to affirm this request.

"It follows from what has been previously stated that, in our judgment, the plaintiffs are entitled to have a decree of injunction such as the prayers in their bill request—the costs of the case to be paid by defendants.

"The prothonotary is directed to enter a decree nisi in accordance with the foregoing findings, and to notify counsel of the respective parties that the findings have been filed. Ten days are allowed for the filing of exceptions thereto. If no exceptions are filed within that period the decree nisi will be made final."

This decision of the Pennsylvania Court of Common Pleas, *"that the Practice of Optometry was separate and distinct from the practice of medicine,"* was later affirmed in every particular by the Supreme Court of the State of Pennsylvania.

A somewhat similar state of affairs in Ohio, two years later, almost, but not quite, led to a similar test in the courts. The Ohio State Medical Board, like the Pennsylvania Board of Licensure, undertook to include optometry within the scope of its regulation, and actually went to the length of collecting fees from optometrists in the State for licensure and registration. Ohio optometrists backed by the American Optical Association, foreseeing the danger to the standing of optometry, started proceedings to enjoin the Board from carrying out its intention. In this case, however, the Ohio Medical Board was made to see the

falseness of its position, which it not only publicly renounced in writing, but agreed to return the fees collected from optometrists, and expressly affirmed that medicine had no rights whatever in optometry's premises. Below is a transcript of the resolution adopted by the Ohio State Medical Board, which was made "of record" as a judgment entry in the injunction suit:

"BE IT RESOLVED by the State Medical Board of the State of Ohio, that:

"WHEREAS, on January 4, 1916, the board, acting under sections 1274-1 to 1274-7 of the General Code of Ohio, adopted certain definitions, rules, and regulations covering limited practitioners of medicine and surgery in Ohio, and designated Group 5 of such limited branches Optometry, and

"WHEREAS, the board is now of opinion that under the construction of the law of the State of Ohio optometry is not to be classed as a limited branch of medicine under the statute as enacted, and that the board was not justified on the aforesaid date in classifying same as such limited branch under said statute and in endeavoring to license persons to practise optometry in Ohio, and

"WHEREAS, there was collected from persons who were practising optometry in the State of Ohio, and is being held as agent for such persons, certain fees,

"THEREFORE, BE IT RESOLVED by this board that the said fees be returned to the persons from whom they were received by the secretary of this board; that the said resolutions which were adopted on the said January 4, 1916, be amended to not include the word "optometry", and that any action taken by this board in relation to optometrists be expunged from the records of the board, and be considered as held for naught. That is to say, it is the present understanding of this board that under the laws of Ohio, as constituted today, the board has no jurisdiction in optometry matters.

I certify that the foregoing is in form as adopted.

(Signed) H. M. PLATTER,

January 7, 1919.

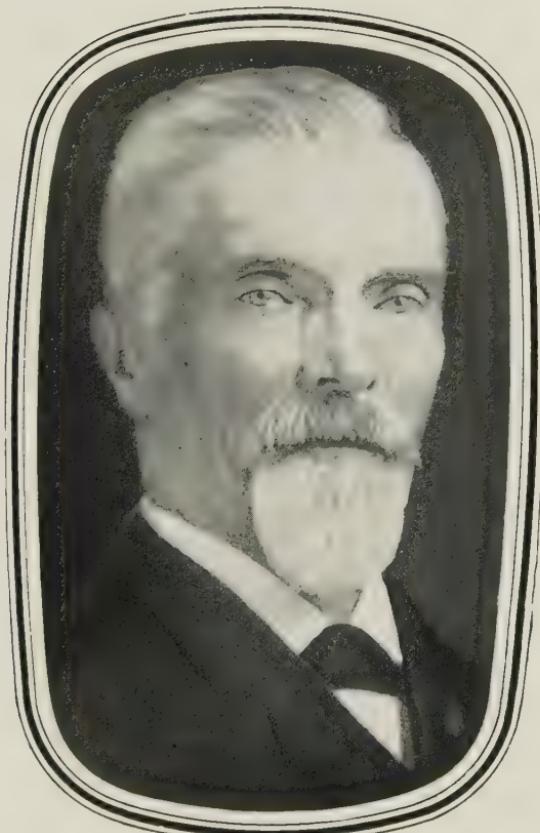
Secretary.

This statement, formally made by the Ohio State Medical Board, and written into the court record, may be aptly regarded as expressing the now well established status of optometry in regard to medicine, as embodied in the laws of every State in the United States and every province of Canada,—that medicine has no jurisdiction in optometry matters.

HE FOLLOWING GREATEST
FACTORS FOR PRESENT
DAY VISION CONSERVA-
TION ARE RIGHTLY ENTITLED
TO THE CENTER PAGES OF THIS
HISTORY OF OPTOMETRY.



JOHN JACOB BAUSCH



CAPT. HENRY LOMB

CHAPTER IX

Bausch & Lomb Optical Co.

—bearing particularly on its relation to the growth of Optical Sciences in the United States

When the firm of Bausch & Lomb was started in 1853 the optical profession was indeed young. At that time the ophthalmoscope and toric lenses had barely made their appearance on the market. Prism binoculars were unknown. Photographic lenses were still in a transition stage. What progress had been made along optical lines had taken place, for the most part, in Europe. It was to that continent, also, that America looked for the manufacture of such optical goods as it offered to the public.

An incident illustrating the backward state of the optical profession at this time is revealed in Mr. John Jacob Bausch's "The Story of My Life." Mr. Bausch states that on first coming to Buffalo, N. Y. in 1850, then a city of 42,000, he was unable to secure work in his trade because of the total lack of optical establishments. In that same year he came to Rochester, N. Y. and found similar conditions existing.

Perhaps it was the lack of optical facilities offered to the public in Rochester which lead John Jacob Bausch to believe that a business started in this line would prove successful. His first attempt was a failure. Nevertheless in the year 1853 we find the retail optical shop established by Mr. Bausch in Reynolds Arcade, which through various stages, has become the Bausch & Lomb organization of today. The stock was purchased in Germany and included spectacles, thermometers, field glasses, telescopes, magnifiers, opera glasses, microscopes and hour glasses.

The new optical organization met with many difficulties. The public of that day little appreciated optical products, and to educate

them to their uses was a long and tedious task. In addition, times were hard, the location was ill adapted to the undertaking and finances were always sadly lacking.

About this time, Henry Lomb was taken into the business. This was most fortunate. Time and again in the troublesome period that followed, the unfailing energy and loyalty of Henry Lomb was an indispensable factor.

It is interesting to note that the optical shop at No. 20 Reynolds Arcade was always more than just a retail establishment. Records indicate that it was a laboratory, a workshop and a miniature factory all in one. Lenses were ground by hand from the first. Frames of various kinds were made and repaired. About 1853, from a piece of hard ruber picked up in the street, Mr. Bausch made his first pair of rubber eyeglass frames.

Rubber frames later became very popular. Events of the Civil War at this time helped the makers of American frames by cutting down European competition. To meet the new demand Mr. Bausch made these articles for a time in the back of his shop and at home. In 1868 workmen were employed and a small shop building was rented. It was in this building that the eyeglass was developed practically to its present state of perfection. Mr. Bausch invented and applied the first nosepiece to an eyeglass, and his samples made in the sixties embodied many of the principles which have since been applied in the construction of eyeglass frames, nosepieces, springs and guards.

It was through knowledge gained in this way that they were enabled to take over in 1866 the rubber eyeglass frame rights of the American Hard Rubber Company of New York. During the next six years the organization enjoyed a very good period of business.

However, the founders of this institution were not satisfied with the development of their business along so narrow a line. Microscopes particularly claimed their attention. Elsewhere in this history will be found the details of their many heartbreaking disappointments in this line—but final success. Suffice it to say that it was through their efforts that microscopes for the first time be-

came available to educational institutions and private laboratories all over the United States—and that Bausch & Lomb are today the leading manufacturers of microscopes throughout the world.

Success in the early manufacture of microscopes had a double effect on this organization. For one thing it brought them recognition in the realm of science, and, in addition, the extreme precision required in this type of manufacture established a standard with them which has since influenced all other forms of optical endeavor.

By 1885 through invention of the dry plate process and the Iris Diaphragm Shutter by Edward Bausch in 1887, photography received a definite stimulus. In the manufacture of photographic lenses, Bausch and Lomb soon took the lead. They secured rights to the Zeiss Anastigmat Photo Lens in this country.

Following close upon this came the manufacture of projection apparatus. This was undertaken and became popular in home and educational circles under the name of Balopticon.

Next came photomicrographic equipment in response to industrial needs. Research and more rigid inspection methods in recent years have called for the most exacting instruments. This is especially true in metallographic lines where magnification reaches in some instances as high as 6000X. It may be safely said that, at the present time, no finer photomicrographic instruments are made.

Although they had manufactured their own ophthalmic lenses from the beginning it was not until 1878 that the general lens market was entered. Through their efforts standardization of the concave curve of the periscopic lens was brought about. This encouraged the use of cement bifocals.

Meniscus lenses were first manufactured by Bausch & Lomb in 1896—and toric lenses the year following. They have held exclusive rights to the manufacture of other optical products since 1908. In the realm of bifocals they have always played a conspicuous part—and at the present time sponsor the most perfect of bifocal forms, the Nokrome.

It was in the early use of meniscus lenses that Bausch & Lomb

developed their first ophthalmic instrument, the Dioptrometer. Other instruments followed, and in 1913 Mr. W. A. E. Drescher spent several weeks abroad studying the best appliances then available. He brought back with him the Gullstrand Ophthalmoscope, the Exophthalmometer and knowledge of the working principles of the Slit Lamp.

Further development produced B & L Precision Test Lens Sets, the Ives Visual Acuity Apparatus, the Stereo Campimeter, the Morton Ophthalmoscope, the Clason Acuity Meter, the Koeppe Slit Lamp, Ferree-Rand Perimeter, the Troncoso Gonioscope and the Keratometer. Another important contribution in this line has been an excellent series of diagnostic sets that are priced within the reach of every practitioner.

Along with the foregoing came Mangin and Parabolic types of searchlight mirrors for naval and military purposes, and later for automobiles.

In the realm of scientific research Bausch & Lomb were again pioneers. Their scientific bureau was organized as early as 1906. In 1907 according to agreement with the Carl Zeiss Co. of Jena, Germany, the results of the studies of the research bureaus of both institutions became available to the other. Much benefit to optical progress in both countries ensued. These relations with the Zeiss organization were terminated with the world war and have not since been renewed.

One of the greatest achievements of Bausch & Lomb in recent years has been their advancement in the manufacture of optical glass. In 1912 William Bausch instigated elaborate experiments along this line with a view to disproving the contention that ingredients for this product could only be secured abroad. In 1915 the first success was experienced. With the entry of the United States into the World War still further progress was made, with the aid of government scientists. Today, it may be safely stated that the quality and precision of optical glass put out by this organization is at least equal to any similar product now or ever before produced.

During the World War Bausch & Lomb worked at peak capacity

in the production of war materials. These included prism binoculars, range finders, periscopes, gun sights, telescopes, torpedo tube sights, and projection mirrors. Binoculars alone were at one time produced at the rate of 3500 a week. Some 6000 men and women, skilled in their various tasks, worked loyally in the B & L factory throughout this period.

With the purchase of the Stevens Company of Providence, R. I., in 1923, a very attractive and complete line of frames and cases was added. This very definitely rounded out the variety of optical services offered to the profession.

From the foregoing it will be seen that supremacy in the field of optical manufacture has been acquired through a long period of development, and that this development has been a definite factor in the growth of optical sciences throughout the world.

Bausch & Lomb owe their present leadership to many things—the industry and wisdom of their founders—a policy of quality regardless of price—and, last but not least, the loyalty and high ideals of the optical profession in general toward Bausch & Lomb standards of excellence.

The history of this firm is an illustration of the tendency of small events to decide great issues far in the future. Also, it illustrates the fact that occurrences can have far-reaching results of distinctly unrelated nature. Two incidents referred to show this principle at work. One is the loss of two fingers sustained by John Jacob Bausch in 1852 in a wood turning establishment, which led him to decide on optical endeavor as his life work. This Mr. Bausch gives as the first turning point in his career. The other is the fact that his attention to small things led him to pick up a piece of hard rubber on the street and from it to get an idea which meant important financial returns to this company in its early period of need. In the incident of the injury, who could foresee the begining of a series of events leading to the existence of the greatest optical institution in America? And in the finding of the piece of hard rubber, who could have prophesied that the idea it suggested would cancel the debts of the struggling partnership and put a balance in the bank?

Many were the austere and forbidding expressions which bristled behind the eyeglasses of 1850—and naturally enough! Optical appendages in those days pinched their way into the very disposition. They perched unsteadily. They jumped nimbly off the nose at the slightest provocation.

Yet even in that day, pioneers in optical manufacture, John Jacob Bausch and Henry Lomb, were making definite progress. It is interesting to note that in their tiny shop at 20 Reynolds Arcade they developed many underlying principles of the industry as we know it today.

The world is certainly growing better. No longer is the eyeglass used to extort confessions from youthful culprits, or instil in sinners the fear of other worlds. Rather is it a source of inspiration. Eyes are made to see farther and clearer. Real comfort is achieved. An appearance of alertness and good taste is unquestionably imparted.

In these achievements Bausch & Lomb find both a source of pride and a challenge. A source of pride in the part played in the development of the last seventy-five years. A challenge, because Bausch & Lomb must continue to blaze the trail and set the standards of a profession.

A vast world, a veritable universe, lies beyond the sight of the normal human eye. Miniature forests, vast communities of animal life, strange crystalline forms are about us on every hand. Moreover, we have come to learn that these small, unseen organisms are highly important in our daily existence. Science shows us how health, nourishment, and life itself are thus effected. It is the microscope that reveals these myriad facts to the scientific eye.

Yet the study of science in this country is of comparatively recent origin. Up until fifty years ago microscopes and laboratories were very few indeed. Such microscopes as were available were of European origin and prohibitive in price except for the most wealthy institutions. It was the boast of a certain optician in Philadelphia in 1870 that he was the only man in America who could grind microscope lenses. The general backward state of scientific progress at that time was greatly deplored by savants throughout this country.

John J. Bausch and Henry Lomb always had the ambition to build microscopes and finally to that purpose in 1875 engaged E. Gundlach, a man with high European reputation. A series of unfortunate occurrences, however, almost ruined the enterprise. It was only after years of indefatigable effort that success was finally attained.

Much of this success must be credited to the efforts of Edward Bausch, who began building his own microscopes at the age of fourteen. It was he with the aid of his brothers Henry and William who guided the development of this instrument in the Bausch & Lomb factory at every stage.

The first B & L microscopes were completed in 1875 and were exhibited at the Philadelphia Centennial Exposition. Not only did they receive honors, but recognition was accorded by many scientists both here and abroad.

The aim was to make B & L microscopes of the highest grade and to produce them at a price that would put them within the range of students and scientists who were struggling without the aid of endowments. These early efforts of Bausch & Lomb were greatly appreciated.

Various microscopes of this organization have won prizes at the following expositions: Centennial Celebration 1875—International Universelle, Paris 1878—World's Columbian, Chicago, 1893—Tennessee Centennial, 1897—National Export, Chicago, 1899—International Universelle, 1900—Panama Pacific, San Francisco, 1915.

To date they have supplied the world with over 200,000 microscopes. Their products number some forty-eight distinct styles of instruments, not including a host of attachments and supplementary apparatus.

Bausch & Lomb are proud of the part they have played in the past development of science. They are proud of the part they are playing today—in industrial research, in clinics, hospitals, private laboratories and in institutions of learning throughout the world.

As civilization becomes more complicated vision must extend its scope. Eyes must see *better* the details of things apparent to

our vision; *see farther*, not only in terms of distance but also into those scientific realms beyond the range of the unaided eye. Bausch & Lomb stand as history-makers in the ceaseless invention and perfection of means to these ends.

Let us consider for a moment how optical progress has furthered the ends of mankind.

Microscopy

In the pursuit of many sciences the microscope is indispensable. It is used in the bacteriological laboratory to spy out the virulent bacteria in water, milk and other food. In biology its uses in physiological, zoological and botanical research are well known. The metallurgist needs it in the examination of ores; the chemist often finds in it a necessary assistant. Students in high schools, technical schools and colleges learn correct methods of research through its use.

Yet the many benefits to science through the aid of the microscope in this country have been of comparatively recent date. It is only since 1875, and the manufacture of quality instruments by Bausch & Lomb, that modern progress has been possible.

Photomicrography

Research methods have taken the place of rule-of-thumb procedure in the industries of today. Almost every large organization has its bureau for the study of raw materials, progresses of manufacture and finished products. Photomicrographic apparatus here plays an important part. By its use tiny imperfections and strains of all kinds are detected. Much of the efficiency of modern production finds its beginning in this way.

In this, as in other lines, Bausch & Lomb have taken an important part. They furnish many of the best photomicrographic instruments available.

Telescopy

To the study of astronomy mankind owes much. We are now able to understand the formation of our own globe through study of the process of world formation still going on in other realms. Yet the heavenly bodies do not give up their secrets

easily. Billions of miles which intervene make observation impossible except with the aid of one of the most highly developed of optical forms, the telescope.

It is interesting to note that many of the best telescopes in use in schools and colleges as well as private observatories today, are the product of Bausch & Lomb.

Photography

Then there is that mechanical eye with a perfect memory, the camera lens. The results of photography depend to a great degree on the perfection of this product. Various other reproduction processes such as lithography, rotogravure and the making of half tones and etchings depend similarly on the quality of the lens used.

Bausch & Lomb were pioneers in the photographic lens industry. Lenses for motion picture projection today constitute a significant part of their lens production.

Military Purposes

In the manufacturer of materials of war lenses play an important part. Examples may be found in searchlight mirrors, gun sights, periscopes and range finders. Since in times of emergency many lives depend upon the efficiency of these instruments, precision is of paramount importance. Range finders, for example, call for accuracy of a high order. On account of great distances and infinitesimally small angles involved the slightest error would render any instrument of this kind worse than valueless.

The extensive part played by Bausch & Lomb in the manufacture of such materials during the recent war is well known.

Aids to Natural Vision

The greatest aid to mankind through optical manufacture lies, of course, in optometry and ophthalmology. Through their agency, early imperfections in vision are often corrected—age is made to see again with the eyes of youth—civilization's cruel demands on man's natural powers of vision are fortunately compensated in a large degree by modern optical appliances.

Bausch & Lomb have always been pioneers and leaders in this line, perfecting and promoting new and better types of bifocal and single vision lenses.

* * *

Thus it will be seen that optical progress has done much for the health, education, enjoyment and progress of mankind.

In this, Bausch & Lomb claim a conspicuous part. In almost every phase of development they were the pioneers of the past and remain leaders today. And in the future they will continue to toil ceaselessly—

“that eyes may see better and farther.”

From the far corners of the world come the quality raw materials which, in turn, must produce the quality optical products of Bausch & Lomb.

Lenses, how simple the finished article appears! Yet in their grinding and polishing are used corundum from Madagascar, iron oxide from Quebec and Spain, diamonds from Brazil and South Africa, the finest of wool from Australia. The optical glass from which Bausch & Lomb lenses are made, contains sodium nitrate from Chile, and barium hydrate and potassium carbonate from Germany.

Other materials of foreign origin are: Shellac from India, China wood oil from China, brush bristles from Russia and special instrument makers' equipment from Switzerland.

Thus will be seen the infinite care in selection of raw materials for the optical products of Bausch & Lomb.

“The Earliest Settlers”

Is what they call the eight men whose period of service with Bausch & Lomb extends back for more than fifty years. The honor roll reads in order as follows: Henry Finche, Jacob Dentinger, Edward Bausch, Edward Hilgenreimer, W. A. E. Drescher, Wm. Bausch, George Zimmerman, Carl F. Lomb.

These men have played their part in the growth of a great industry. They have seen it develop from a small three story building to a series of spacious factories with floor space of over

a million square feet. They have seen it change from the manufacture of a few specialized optical products to a most complete line. They may well be proud of their share in the making of a great organization.

It is interesting to note that in spite of their accumulation of years these "earliest settlers" of Bausch and Lomb are still young in spirit. The same enthusiasm which has carried forward a great undertaking is still in each case apparent in their aggressive demeanor and bearing.

Yet these are but the nucleus of a much larger group. There are 250 men and women with Bausch & Lomb who have served over 25 years. Forty of these have over thirty-five years to their credit. All told, these 250 men and women have been with Bausch & Lomb over 8670 years.

Bausch & Lomb owes much to the men who have seen long periods of service. Their combined experience adds materially to the efficiency of all departments. Their loyalty and enthusiasm kindles like qualities in the younger members of the institution. It is through their efforts, to a considerable extent, that early principles of precision and thoroughness continue to make Bausch & Lomb products a standard of excellence throughout the world.

Like all truly great men, John Bausch could attribute a large measure of his success to his ability to gather around him other capable men who were leaders in their line. His most intimate associate was Henry Lomb and he suffered a severe loss in the death of his life-long friend and comrade, on June 13, 1908.

Mr. Bausch paid the following tribute to the unfailing faith of Henry Lomb, whose devotion to their struggling business meant so much in the early days when success seemed so far off.

"After my injury, Mr. Henry Lomb brought us twenty-eight dollars which he had collected for us among friends I borrowed sixty dollars from Mr. Lomb, promising him a partnership if the business ever permitted. . . . Henry Lomb boarded with us in order that no money should be taken away from the firm. . . . During his absence in army service, he regularly sent me his monthly wages, a great help since at that time gold was scarce."

For a full three quarters of a century—a time much longer

than the average span of life—Mr. Bausch was the active head of the business he founded. His activity continued until a few months before his death, when sickness confined him to his home. And with his passing, he has left behind him an organization that is wonderfully complete and capable in its personnel, a group of men who are well able to carry on his ideas of service to the optical needs of the world.

John Jacob Bausch, President of the Bausch & Lomb Optical Company, and the optical pioneer of America died at his home in Rochester on the morning of Sunday, February 14. Mr. Bausch was in his ninety-sixth year, and for several months his health had gradually failed.

The Bausch & Lomb plant was closed on February 16, the day of the funeral. During the morning, despite the extremely inclement weather, hundreds of the workers assembled at the factory and for two hours and more walked, in a slow and solemn procession past its closed doors, on down St. Paul Street to the home of Mr. Bausch, where for the last time they paid their respects to the man whom they had for so many years loved and revered.

Funeral services were held in the afternoon. In addition to the family and close friends, it was attended by the heads of departments and by a number of out of town members of the industry who had been close to Mr. Bausch during his years of activity. Interment was in family plot at Mt. Hope Cemetery and as the funeral cortege passed the factory, the old bell in the tower tolled its final tribute to the man who had placed it there so many years before.

At the funeral services held at the home of Mr. Bausch, the Rev. Dr. Frederick J. Frankenfeld painted a splendid word-picture of the character of the man. Dr. Frankenfeld's eulogy follows:

"To pay a tribute to the very unusual life and character of 'Father' Bausch to me is not a solemn professional duty, but rather an extraordinary personal privilege. Having been, for fifteen years, his neighbor and as such an interested and a close observer of his ways and habits, I covet sincerely

in connection with many other business, as being the best he could be, in memory of the days past, to be seen and known.

It is not my purpose to write upon the early history of my father, as this is not to me the most important of the early historical features of the early days of my life, and of course in the later years in risk to romance and fictitious achievement.

The world has given us his own word in his works, the business and the early days of his career, which I have written in the history of our country, many and many a year back, that the early days of his career, especially during his working days, in the early days of his life, he was a man of great worth, and among us today are several hundred men who because of their business relations have more than a personal knowledge of him, and a half century ago much better qualified to speak of these than am I.

I would just like just a single word, however, of the man among men. The man of the working class, of the working classes of this world. The man who would always, for all his life, a working man, who could not, in the early days, during his working days, and even before, in his own personal history. The man whom God has not yet given him a place to hold there, who forever was the spirit of the working class, who died in the days of prosperity and affluence, leaving a memory of the life which marks the strong and noble character and a family which is still the friends of all the poor.

What is there to say more to be said of this just to be known as a real working man?

The thing that always impressed me and that I will cherish in my memory of my father is the fact that Father Baumer, in more than a mere name. He was a father to a large number, because of my name, and a large number of other persons, and the great number of my children, and the number of children in the name. Hence he was the father whom every family had. The welfare of his children and the children's children was ever his deepest concern.

The love and loyalty and devotion of home was for him the only real pleasure of life, and the only great source of all great happiness. What a loss of happiness that generation is to him to have lost a true father. How much better this world would be if we had more of them.

Indeed he was a father to this town, as he passed a funeral in the following

than the average span of life—Mr. Bausch was the active head of the business he founded. His activity continued until a few months before his death, when sickness confined him to his home. And with his passing, he has left behind him an organization that is wonderfully complete and capable in its personnel, a group of men who are well able to carry on his ideas of service to the optical needs of the world.

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the opportunity of sharing with many others the testimony we bring this day to honor the memory of our distinguished fellow citizen and friend.

"It is not my purpose to review upon this occasion the very interesting history of his eventful life nor to relate the varied experiences of his long industrial career—in the earlier days so full of struggle and disappointment, in the later years so rich in romance and glorious achievement.

"He himself has given in his own words to the world the fascinating and thrilling story of human accomplishments seldom equalled in the history of our country; many monuments in other lands bear eloquent witness of the almost unparalleled successes which crowned his untiring labors, until declining strength made further conquests impossible; and among us today are several hundred men who because of close business relations for more than a quarter—in some instances for over a half century—are much better qualified to speak of these than am I.

"I would in just a few brief, simple words recognize the man among men. The man of far reaching vision, of undaunted courage, of unfailing hope. The man who could always rise above life's most trying circumstances, who could triumph over the most perplexing difficulties and turn apparent defeat into glorious victory. The man whose word was his bond, whose honesty was his trade mark, whose fairness was the secret of his influence. And withal, the man who in the days of prosperity and affluence maintained a simplicity of the life which marks the strong and beautiful character, and a humility which is ever the foundation of true greatness.

"What is there on earth more to be desired than just to be known as a man among men?

"One thing that always impressed me and that I will cherish in my memory of the departed is the fact that 'Father' Bausch is more than a mere name. He was a father in a sense which thousands of men have entirely lost. Large business interests, perplexing problems, unavoidable worries could not undermine his throne in his home. Here he was the center about which the family moved. The welfare of his children and his children's children was ever his deepest concern.

"His love and loyalty and devotion at home won for him the undying affection of all within and the unfeigned admiration of many without. What a lasting benediction upon generations to come to have been a true father. How much better this world would be if we had more of them.

"And as he was a father to his own, so he proved a friend to his fellow

CHAPTER X

Andrew J. Cross, Optometrist

Optometry's "Grand Old Man"

A history of modern optometry without a chapter devoted to Andrew Jay Cross would be like Hamlet without the Prince of Denmark. Mention has already been made of the part he played in the now historic fight for optometric legislation. He was, in fact, one of the chief and most active figures in that drama. And he was similarly identified with the early development of the educational features of optometry, especially those relating to the higher education of optometrists, in which he was intensely interested, and to which he devoted himself with almost a passionate devotion. But it is of the man himself, and his distinctive contributions to the science and practice of optometry, that we here wish to speak. He came to be known as the Grand Old Man of Optometry,—an appellation which he richly earned; for it will hardly be disputed that no single man gave of himself more fully and freely to the cause of optometry, and none had more valuable gifts to give.

Andrew Jay Cross was born at Antwerp, N. Y., in 1855, of old Colonial stock. From his earliest youth he was interested in refraction, and in 1876 he went to California, and commenced the practice of refraction at Visalia, in that State. While in California he was married, in 1878, to Alice Margaret Boyer, of which union two children were born, one of whom died in infancy, the other, a son, Frank Bethel Cross, survives him, and is a practising physician in Brooklyn, N. Y. It is to Dr. Frank B. Cross that this history is indebted for the salient facts of his father's biography.

In 1881 he went to Walla Walla, in what was then the Territory of Washington, where he remained until 1884. In that year

he returned to the East, and went on the road for Hartzog and Company, of Philadelphia, Pa. During this time he established himself as an optometrist, visiting, in turn, for a few days to a week at a time, sixteen different cities in New York, Pennsylvania, and Connecticut. The outcome of this professional experience was that in 1889 he opened his first optometrical office in New York City,—an upstairs office at 18 West 23rd Street.

His success in New York was phenomenal. He not only won the complete confidence of the public, but his wealth of scientific knowledge and his friendly readiness to help others in the profession gained for him the love of his fellow practitioners throughout the State.

In 1896 he married his second wife, Flora Shriner, who survives him. And in the same year he moved his office to 20 East 23rd Street.

In 1898 Dr. Cross was elected President of the New York State Society of Optometrists, and two years later became President of the American Optical Association. Up to the time of his death he bore the distinction of being the oldest living ex-president of the national organization. A past president of the American and of the New York bodies, with honorary membership in thirty-two State associations, he was known to optometrists throughout the length and breadth of the land.

Throughout his entire life, Cross was an enthusiastic research worker, a teacher, and a lecturer, full of earnest zeal in the cause of his profession, and strong in the power of imparting both his enthusiasm and his knowledge to others. He had a genius for expounding optical theories and facts in a way that made them simple to grasp, and study under him was a pleasure.

In February 1911 he was instructor in the first course in Theoretic Optometry given by Columbia University, and for fourteen years occupied the chair of Lecturer in that subject. His retirement from that post in April 1924 was the occasion of a special dinner of appreciation given by his associates, former students, and visiting optometrists from other countries. He always retained his in-

terest in, and his affection for, his students. Even after his retirement from the University he frequently returned to the lecture rooms, where he was always a welcome visitor and invariably invited to discourse on his favorite subject.

Scientist, teacher and author, Dr. Cross was also an inventor. For seventeen years he worked on the development of a bifocal lens which should be monocentric, eliminating the annoyance of bicentricity. He gave his attention during the last ten years of his life to the perfection of this invention, and some three years before his death he announced the production of a practically perfect monocentric bifocal lens. He had carried the torch lighted by Benjamin Franklin, father of the bifocal lens, further than any man of his generation; for which achievement alone Cross will rank high in the annals of optometric history.

But Cross' crowning contribution to optometric science and practice was his invention and development of Dynamic Skiametry. It is by this that he is, and will continue to be, best known. It is the outstanding,—one may truthfully say the sole—original, basic contribution to optometry in the last half century. It has already revolutionized the practice of refraction, and the extent of its possibilities does not yet appear.

We are in the habit of speaking, rather loosely, of static and dynamic skiametry as though they were two phases of the same thing, and as though Cross had but shown us another way of performing a time-honored test. That, of course, is far from the truth. Both the principle and the interpretation of dynamic skiametry are radically different from those of the static test. By the static test the passive refraction of the eye was measured, with all the accommodating and converging effort,—the two vital factors in the visual act upon whose proper coordination visual efficiency, from a refractive standpoint, depends,—deliberately excluded. By Cross' method, for the first time in history, the accommodation was objectively caught and measured, as it were, "on the wing," and the coordinating relation between accommodation and convergence determined, and if need be, corrected.

In addition to the revolutionary principle of dynamic skiamet-

ry, and the heretofore unobtainable data that it furnished, it had the further practical advantage that it permitted accurate refraction of the eye without the employment of a cycloplegic,—far more accurate than is possible with one. The only legitimate object of a cycloplegic in ocular refraction is to rid the ciliary muscle, by temporarily paralyzing it, of spastic or excessive contraction, which it cannot or will not normally surrender, so that the measurement of its static refractive state may be a truly static factor. But in dynamic skiametry this is not only unnecessary, but undesirable. For, when the operator is measuring the accommodation **in force**, the quantity measured contains and includes the involuntary, spastic component; and the amount of the latter can be accurately determined by comparing the total finding under the dynamic test with the finding under tests where it was not included.

Someone has said that Cross was the Edison of modern optometry. There can be little question that his invention of dynamic skiametry did more than any other one contribution to give optometry its distinctive and outstanding scientific status. With all due respect to the lens-fogging method, (the value of which we do not for a moment belittle), it is exceedingly doubtful if, without Cross' dynamic test, optometry would have been able successfully to outride the medical argument for the use of eye drops. Dynamic skiametry put into optometry's hands an objective procedure, purely optical in character, the product of an optometrist's brain, which forever lifts optometric science and practice out of the realm and the limitations of medicine, and makes it adequate to carry out its own function in its own way. Just as natural science may be said to be divided into two periods, before and after Darwin, so modern optometry may almost be said to fall into two periods, before and after Cross.

The work of Andrew Jay Cross is still fresh in the memory of most,—as his genuine and lovable personality is still warm in their hearts. His name and achievements will shine brightly and permanently with the truly great stars of the optical firmament.



GEORGE W. WELLS

1846-1912

CHAPTER XI

History of American Optical Company

Its Contributions to the Advancement of Ophthalmic Lenses and Instruments

The history of optics is so closely connected with the history of American Optical Company, of Southbridge, Massachusetts, that one can hardly be considered in the absence of the other. Tracing its beginning from a one-man enterprise in 1833 which grew to a seven-man organization in 1846, then to thirty-five men in 1868, American Optical Company, today a great manufacturer of ophthalmic lenses, spectacles, optical machinery and cases, employs 2500 workmen in the main factory at Southbridge, and as many more representing the Company in all parts of the world. The products of the factories in Southbridge are distributed in the United States through 150 direct factory branches. American Optical Company maintains two factories in the Dominion of Canada, at Nicolet and Belleville, and its products are distributed through a Canadian subsidiary, the Consolidated Optical Company with its sixteen branches. Agencies of American Optical Company are to be found throughout the world.

Spectacles were first made in Southbridge in 1833, and it was this activity which, after changing hands and names several times, became American Optical Company in 1869, under the guiding influence of George W. Wells. The spectacle business of Southbridge in the early half of the nineteenth century showed the same pioneering spirit that has meant so much to its subsequent growth. The first steel spectacles manufactured in America were made in Southbridge in 1843. The inventory of 1846 mentions a press—the first hand press

ever used in punching the temples for spectacles. The first patent was taken out in 1850. It was for an improvement in temples.

Throughout its entire history, American Optical Company has been a leader in contributing machines and machine design for the manufacture of better optical products. In the pioneer period of the Company's history, anyone who could accomplish, invent, or develop new ways of manufacture was to be hailed as a leader.

The Executives of the Company

In 1865, a youth under twenty by the name of George W. Wells, attracted attention in Southbridge by putting into use the first Craigleith Stone, primarily for edging the so-called split bifocal lenses, which were mounted in Southbridge. He also built the first lens cutting machine. This machine with slight modification is now in use throughout the world in optical factories and job shops, almost sixty-five years after its completion. He built the first machine for jumping and forming spectacle bridges. He invented the first machine for peening or knocking on end pieces, and he advanced many other devices to shorten and improve the method of manufacturing spectacles.

George W. Wells accumulated enough shares in the spectacle firms in Southbridge by exchanging patents and ideas for stock so that, four years later, in 1869, although not yet 23 years old, he was of prime importance in re-organizing and incorporating American Optical Company. And the colossal growth and development as well as the universal reputation for broadening the skill of optical science which American Optical Company now enjoys is due primarily to George W. Wells—and the Wells family, for his sons also took up the noble cause.

In 1913, succeeding his father whose death occurred that year, Channing M. Wells became president of American Optical Company. Nearly twenty-five years of successful work

in many various departments of the business had prepared him well for the position. In 1891, after studying at the Massachusetts Institute of Technology, he started to work in the shipping department, in 1901 he became a director, in 1903, treasurer; in 1908, vice-president, and in 1913 president.

Albert B. Wells entered the business in October, 1891. He spent most of his time at Lensdale, and to him is due much of the success that the Company has achieved in the field of lens-making. He gathered about him the best lens experts of the Country, and has spared nothing in either men, equipment or buildings, to develop a great organization. In 1902, he became a director, and in 1908, treasurer, and has been in charge of the financial structure of the Company ever since.

In 1903, J. Cheney Wells was elected secretary of the Company. He had started at the age of 19 in the shipping department. Since 1908 he has been a director of the Company, and shortly after added the duties of vice-president, becoming both vice-president and secretary. His interest in the main plant and its production has meant a great deal in the development of the spectacle business.

To these three men much of the credit for the constructive history of the American Optical Company is due. It has enjoyed a tremendous growth under their long management, for even before Mr. George W. Wells's death, he had entrusted a constantly increasing share of the executive responsibility to these three capable men.

The American Optical Research Division

To George W. Wells belongs the credit for making possible the American Optical Company Research Laboratory, exclusively devoted to optical development. He is credited with making the following statement in the early 90's:

"Our responsibility is great. Only through our devotion to scientific study and invention can eyesight specialists obtain the accurate equipment and the quality of glasses they need in order to make imperfect eyes see

perfectly. From now on, we shall spare no expense on scientific research and experiment until those who most need glasses—a quarter of the whole public—shall have glasses of true scientific merit."

The spirit of this message was not forgotten by his son, J. Cheney Wells, now vice-president and secretary of the Company. In 1909, he founded the research laboratory of American Optical Company. This laboratory has been the scene of many important developments and painstaking research both by American Optical Company scientists and visiting scientists.

The present Research Division of American Optical Company comprises four well-defined departments, under the executive direction of Atty. H. H. Styll, of the AOCO. Patent Division. In the study of light before it enters the eye Edgar D. Tillyer, D.Sc., takes the lead, assisted by A. Estelle Glancy, Ph.D. In the study of light after it enters the eye, Chas. Sheard, Ph.D., of the Mayo Clinic at Rochester, Minn., is retained. In the study of Metallurgy as applied to optical supplies, W. J. Wrighton is chief metallurgist. For Chemistry, C. H. Ohlwiler, is chief chemist. There are, in all, eighteen members of the Division, each having a three-fold duty:

1. To devise factory control methods—that is, to analyze glass, acids, oil, metals, rouge, and whatever other materials enter into the manufacture of the lenses and frames and instruments, and insure that only materials of a uniformly high standard are used.
2. To solve difficult problems for the profession as they arise.
3. To experiment and do purely abstract research work, always, however, striving to better human vision.

Although the investigations of American Optical Company's research division have extended into every phase of the optical profession, only such developments as pertain to lenses and instruments will be touched on here.

This is the day of marginally corrected lens. Its use is

widespread and growing—duplicating the history of the toric lens in the early 1900's. In view of this, it is interesting to trace the history and development of the manufacturer whose Research Division has not only developed a lens which is corrected for both power and astigmatism—but who pioneered in this field by proving the practicability of corrected lens prescription service.

The Tillyer Lens

Probably the greatest single achievement of the American Optical Company Research Division is the marginally corrected lens developed under the leadership of Dr. Tillyer. As early as 1804, physicists recognized the problem. Since then, such eminent men as Wollaston, Ostwalt, Tscherning, Percival, Gullstrand, Von Rohr, and Gleichen have worked with varying success on this problem of an accurate or corrected lens. Von Rohr did patent in 1910 a lens with margins corrected for a fixed amount of astigmatism, and this lens reached the market in 1915. It was a factory prescription proposition and to be accurate had to be ground by the factory on both sides.

The idea of the corrected lens, therefore, is not new. But the distinction of combining correction for both astigmatism and power, and the further distinction of making such complete correction available to the optical trades and professions through prescription service for the first time, belong to our own generation—to the Research Division of American Optical Company under the capable leadership of Dr. Tillyer.

Dr. Tillyer had been working on this question of marginal errors of lenses for a number of years, and in 1917 he applied for his first patent. He followed this up with his second patent, for which he applied May 28, 1924, and which was issued June 15, 1926, in which he evolved the theory of balancing the astigmatism and the focal error in the margins so that there would be neither a variation of astigmatism nor focal power that would be perceptible to the eye. He incorporated with this his idea of the shifting base so that his lens

could be made in a practical way at the factory and be distributed in the optical business just like the older types of lenses had been distributed. He applied his correction to bifocal as well as single vision lenses, and today this lens has received an overwhelming endorsement by the profession.

Developments in Absorption Glass

Ranking second in importance only to Tillyer's Lenses, are the American Optical Company Research Division's achievements with absorption glass. With the beginning of 1915, it was announced to the trade, American Optical Company would be the first to produce and the first to market the new Crookes Glass Lenses in America. Sir William Crookes in 1909 had begun investigations on a colored glass at the invitation of the Glass Workers Cataract Committee of the Royal Society. The main object of his research was to prepare a glass which would cut off the rays from highly heated molten glass which damage the eyes of workmen. At the same time he could not obscure too much light or materially affect the colors of objects seen through the glass. In six years of experimentation, Sir William Crookes perfected a tinted glass answering the requirements, which was commercially practical, and it was named Crookes Glass.

Crookes Glass enjoyed a rather brief, checkered career in America. It was somewhat objectionable because of a dark color which casts a shadow under the eyes of the wearer. Its protective properties, however, were recognized by scientists, professional men, and such patients as used it. But the main difficulty with Crookes Glass was that it was not patented. As a result the market was flooded with inferior low priced glass and reliable dealers lost confidence.

Again, the Research Division of American Optical Company relieved the situation by the development of Cruxite Glass. This was done through the initiative of Albert B. Wells, the treasurer of American Optical Company. Cruxite lenses retained all the beneficial properties of Crookes Glass,

without the objectionable color or lack of uniformity in the visible transmission. Cruxite lenses are the dependable absorption lenses adopted by most leading practitioners today, giving, as they do, just the right amount of protection for eyes, without the objectionable features of color distortion or unsightly appearances.

As in the field of eye correction, American Optical Company is a leader in the field of industrial eye protection. Its "goggles for every industrial need" are well known throughout the world. In this field, the Research Division has made splendid absorption glass contributions in the nature of welders' and furnace workers' glass. The development of Super-Armorplate lenses, of Noviweld glass and Calobar glass is an interesting history in itself.

The Monaxial Bifocal

American Optical Company is recognized as the world's largest producer of bifocal lenses. It has reached this pre-eminent position through the quality of its product. As a licensed manufacturer of the well-known types of blanks through the years, its reputation has spread. Realizing that fifty per cent of the work of the professional man is in the bifocal field, it has endeavored always to give him the best it can in bifocal manufacture.

Here again, the Research Division has shown its hand.

The most serious objection to bifocals has always been displacement of objects when the line of sight passes from distance into the reading portion. American Optical Company's Research Department finally overcame this difficulty with the merged type Monaxial—that is, the bifocal with the straight line in the 180° meridian. Monaxial bifocals do not have a "blind spot." These bifocals are available in Tillyer Lenses.

American Optical Company in the Field of Lens-Making

The modern history of lens grinding begins with the use of eyeglasses in the sixteenth century. Naturally, it was many years before anything more ambitious than grinding a

single lens by hand for a special case was attempted. Until the year 1884, practically all lenses were imported into America, although it had always been the dream of George W. Wells to obtain for America a more reliable and adequate supply of lenses. Foreign manufacturers hesitated before increasing their factories, for they hardly believed that the demand from America was legitimate. And even after a shipment arrived, the quality of the goods was likely to be second-rate, and the focus of the lenses different from specifications. Orders were often a year in being filled, and in some cases, it was impossible to fill orders for the want of lenses to go with the frames.

In 1883, American Optical Company decided to produce its own lenses in America. It was a daring venture, for very few people in this country knew anything about the practical problems involved. On January 18, 1884, the new lens plant (size 30 x 60 feet, two stories and basement) began to produce spherical lenses. The plant was equipped in 1893 to manufacture cylinder and compound lenses. It is interesting to note that before this time, American Optical Company had adopted the dioptic system of measurement.

The exact date when American Optical Company took up the manufacture of toric lenses is unknown, but by 1902, toric lenses were in heavy production. In 1903, the toric attachment for a regular spherical lens grinding machine was put into operation. The toric wheel machine appeared a year later.

The modern outcome of this pioneering lens plant is Lensdale—an enormous factory with a monthly capacity of one million pairs of lenses—flat, compound, toric, and marginally corrected lenses in crown glass or absorption glass, and industrial protection glasses. Lensdale is situated between a sparkling stream and a wooded hillside—far from the dirt and dust so destructive to the polishing and finishing of lenses.

Facilitating Lens Distribution

Among the great contributions of American Optical Com-

pany to the professions has been the theory of direct distribution of optical merchandise, of factory and prescription branch under one centralized control. Between 1922 and 1928 the Company joined hands with the leading jobbers of the field to accomplish this purpose. A group of well-known concerns became divisions of, and later completely merged with American Optical Company, and Fred C. Merry became vice-president of the company in charge of sales, with headquarters at 70 W. 40th St., New York.

Now, an organization of 150 branches render quicker and more accurate service to the optometric profession. These branches carry complete stocks of lenses, frames, instruments, and ophthalmic supplies, and also the finest uniform adequate machinery for giving rapid and accurate prescription services.

Probably the greatest indication of the value of this direct contact between prescription shop, factory and Research Division is the service that has been developed for Tillyer lenses. Although a complete new set of grinding tools, and a formidable array of checking and inspection tools are necessary to make Tillyer lenses, they were available throughout the Nation very shortly after their development. The value of this direct contact between factory and prescription shop in the maintenance of uniform high quality throughout the range of American Optical Company lens products, is evident, as is their value in speeding up the delivery of lenses to the practitioner.

In connection with its prescription work, the history of American Optical Company in the manufacture of finishing machinery and tools, is noteworthy. The Company has always been known for its fast and accurate prescription shop equipment, as well as for the selection of the finest rouges and emeries for lens-making that can be obtained.

American Optical Company's Contributions in Trial Sets

Although trial sets were first used in 1843 by a practitioner named Fronmuller, this revolutionary idea was not generally

accepted for many years. The common practice was to select the best fitting pair of spectacles from a basketful.

Before 1890, there were practically no reliable trial sets made in this country. In fact the profession took particular pride in the possession of an "imported" trial set.

Realizing the fundamental advantages of the objective method of testing for defects of vision, American Optical Company undertook to produce American-made trial sets. These sets immediately gained favor due to their accurate and systematic focal systems, uniform exactness, and interchangeability with American trial frames.

In 1898 American Optical Company developed in connection with Charles F. Prentice a trial set with biconcave and biconvex lenses which exactly neutralized each other. Neutralization was the best method of testing lenses at that time. Following these investigations, all standard trial case lenses were made to a specified center thickness, and the curves of the biconvex lenses were so modified that they were neutralized by the biconcave lenses which were, in turn, the master lenses.

Desiring to establish the standards of lens measure on an even firmer basis, American Optical Company sent a trial set to the Bureau of Standards at Washington. The effective powers of these lenses ranging from .12 D to 20 D were measured and certified as standards not only for trial sets, but for all ophthalmic lenses.

In 1926, American Optical Company introduced what has been termed the foremost advance in trial sets in thirty years—the Tillyer Trial Set. Prior to its introduction, it was necessary to make certain allowances for trial lenses used in combination in the trial frame. The curves, thickness, index of the glass, separation and distance from the eye have been so accurately studied and incorporated in the Tillyer Trial Set that exact effective power is given whether the lenses are used singly or in combination.

In this connection, some mention of trial frames should be

made. Coincident with the announcement of the Tillyer Trial Set, American Optical Company introduced the Tillyer Trial Frame to meet the rigid precision requirements of the Tillyer Trial lenses. It has independent eye adjustment, accurate temple adjustment, a wide range of positions for the bridge and with the corneal distance gauge it is possible to locate definitely the distance of the ocular surface of the lens from the cornea, from which effective power is measured. Thus the corneal distance can be determined accurately, and given as part of the prescription for the definite placing of the final prescription lens.

American Optical Company in the Instrument Field

With the advent of cylinder, compound, and toric lenses, there arose a need for an instrument to measure the power of different lenses, of comparing one lens with another. It is quite logical that the company which helped to popularize the Dioptric System of measurement, which pioneered in the introduction of effective power and corrected lenses should take the lead in perfecting a measure for verifying the refractive power of a lens.

The Axonometer patent of 1896 was among the early attempts to determine graphically the optical centers of spherical and compound lenses, and their optical axes. This instrument was manufactured exclusively by American Optical Company at that time. For the next thirty years, men from all parts of the world took out patents for improving and widening the scope of this lens measure. The foremost patents were granted to the American Optical Company Research Division in 1921, the final outcome being the present American Optical Company's Lensometer, Jr. The Lensometer, Jr., tests with light and not by guess work or mechanical means, the actual effective power of all kinds of lenses. It is preeminent as the most accurate means of testing lenses, completely superseding the older methods of neutralization, and is used

on practically the entire production of AOCO. Tillyer lenses before they reach the wearer.

The DeZeng Standard Company

American Optical Company has always realized the interdependence of ophthalmic lenses and diagnostic instruments. Extreme accuracy in lenses would be of little practical value unless the optical instruments for examining the patients' eyes were fully as accurate. And so, American Optical Company always felt a deep respect for one of the foremost creators of diagnostic instruments—the DeZeng Standard Company of Camden, N. J. The two companies have always been closely associated, both forever striving to conserve more effectively human eyesight—the one by bringing diagnostic instruments to a new level of precision, the other by bringing ophthalmic lenses to a new level of precision. It is not surprising that in 1923 American Optical Company purchased the DeZeng Standard Company.

For a third of a century, Henry L. DeZeng contributed scientifically and mechanically to the domain of ear, eye, nose, and throat diagnostic instruments. The principal instruments were ophthalmoscopes, retinoscopes, phorometers, phoroptors, corneal microscopes, transilluminators, and perimeters. Men of authority in professional work have always acclaimed his development of self-contained electrical instruments, covering a period of over thirty years.

Mr. DeZeng designed and patented in 1905 the present straight-handle, self-luminous form of ophthalmoscope. Retinoscopes with true reflecting mirrors, diffusion screens, and flashlight type of illumination are but the culmination of a long series of his experiments of, and his investigations on the retinoscope, dating from 1903.

The lens locking disc, the crown mirror mounting, the Risley prism, the ground Maddox multiple rod, the electric perimeter, the two-part total reflecting mirror—these small but

immensely significant developments are all contributions of Henry L. DeZeng to the practical field of refraction.

In moving to Southbridge, the DeZeng group added the advantages of a tremendous manufacturing organization. All the keymen were retained, and the DeZeng operations became a factory within a factory. All of the specialized departmental facilities were placed at their disposal—the experimental department, the drafting room, the legal counsel, the tool shop, the machine shop, the electrical shop, and the lens factory. The steady distribution through the 150 American Optical Company branches brought a greater degree of standardization and uniformity to the DeZeng products. The whole optometric profession has enjoyed the beneficial results of this joining of forces.

In standardizing many highly different instruments into diagnostic sets, American Optical Company increased the range of interchangeable parts. Interchangeable items not only represent a convenient feature for the practitioner, but they simplify manufacture and distribution considerably.

AOCO. Developments in Instrumentation

The ophthalmoscope, the retinoscope, and the phoroptor have felt the influence of American Optical Company perhaps more than any of the DeZeng instruments. In the first instance, AOCO. developed in 1924, the Giantscope—an improvement over all previous ophthalmoscopes. In 1927, it introduced the Giant Retinoscope, which was provided for both static and dynamic retinoscopy, by both the regular method and a new "band light" method in vogue. In 1927, it introduced the Improved Effective Power Phoroptor, which embodied the principles of Tillyer Trial Set accuracy into the Phoroptor type of instrument.

One of the first things to overcome in developing the Giantscope was the inequality of the electric light bulbs which caused distortion in the projected light. This was overcome first by a ball-and-socket joint, and later by a micrometer

screw adjustment, which allows the bulb to be rotated and moved in all directions until a clear light free from all distortion is projected. This perfect light is then intensified by a high condensing lens which is encased in a sliding tube, making still finer adjustment possible. In addition to the regular illumination the Giant ophthalmoscope has available two light screens—Red-free, and Daylight. By a unique semaphore construction, these distinct types of illumination can be changed instantly.

The Giant Retinoscope is built to contain a still more powerful source of illumination than its predecessor—the Tru-Lite. It introduced the six-volt gas filled concentrated filament lamp. A moveable telescopic objective is incorporated to permit the maximum accuracy of light distribution. A special transparent reflector replaces the old-fashioned silvered mirror. All the underlying necessities are satisfied in this instrument—a total elimination of chromatic and spherical aberrations and sight hole shadows, and decidedly increased illumination with decreased eye fatigue for the patient. At the same time, the instrument provides means to use both dynamic and static, and also “band light” as well as regular shadow methods, and in addition, has a provision for presbyopic operators.

In the improved Phoroptor, the lens changes are entirely systematic and there is the nearest approach to a “mobile” lens conceivable. All lenses are calculated on the basis of effective power, thus insuring findings which are identical with those obtained in the prescription lenses furnished the patient. Fixation prisms, blank and pinhole disc in the rear dial, are indicated on the front dial to avoid confusion and delay in routine refraction. Because of a spirit level adjustment, perfect alignment can easily and quickly be obtained by simply turning a thumb screw. The instrument proper is suspended from above and not below as with older models to eliminate lens cloudiness from the patient's breath.

American Optical Company During the Great War

In a record of this sort, certainly some mention must be made of services of American Optical Company to the United States Government during the Great War. Thousands of pairs of lenses, frames and goggles were furnished, with all deliveries months ahead of the schedule set up by the quartermasters' division of the army. This, however, was far secondary to the quick development of special gunsights, etc., and the complete set up and equipping of a base optical unit and eight mobile units for the Expeditionary forces in France. The Government asked the Company to plan these units and be ready with all equipment in three months. The delivery and plans for the base unit were made in ten days, and the entire work completed well within the specified time.

Bomb sight lenses, negative finder lenses, telescope sights, Collimator and Panoramic sights, machine gun sights—all were made to the satisfaction of the Government, by AOCO. Several important inventions were made by the AOCO. Research Division to meet the needs of the Government.

This splendid record is one in which the Company and optical industry as a whole, may take great pride.

A Complete Nationwide Service to Optometry

Today, American Optical Company meets in as thorough a fashion as possible every requirement in the optometric field. This reliable old company with a background of 95 years of practical experience makes accurate, serviceable diagnostic instruments; the finest ophthalmic lenses; machinery for surfacing the unfinished side of the blank; frames in which to set the vision-correcting lenses; and cases in which to carry the frames. Representative stocks of all products are carried in 150 direct factory branches conveniently located throughout the nation, and these 150 branches form a chain of nearby depots for filling prescriptions for every kind of lens.

American Optical Company has always stayed within this

one field—the field of eye correction and eye protection, and has so concentrated in this one chosen line of endeavor that the profession recognizes American Optical Company as a successful early pioneer and a responsible guide in the past, and as a worthy leader in the future advancement of clear and comfortable human vision.





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ETRISTS AND OTHER
LOYAL FRIENDS OF OP-
TOMETRY HAVE BY THEIR CO-
OPERATION MADE THE PUBLI-
CATION OF THIS HISTORY POS-
SIBLE.

CHAPTER XII

Optometry's Co-Operators with This History

W. S. Todd	Hartford, Conn.
Burton Kaplan	Rochester, N. Y.
J. E. Arant	Manning, S. C.
L. P. Folsom	S. Royalton, Ver.
B. B. Clark	Rochester, N. Y.
W. C. Wilson	Clarksburg, W. Va.
A. S. Haskins	St. Johnsbury, Vt.
Geo. A. Barron	Boston, Mass.
Emil Arnold	Ann Arbor, Mich.
J. W. Kalal	Cleveland, Ohio.
Ethelred Curtis	La Porte, Ind.
G. E. Shoemaker	Cobleskill, N. Y.
M. J. Reynolds	Youngstown, Ohio.
Thos. McBurnie	Brooklyn, N. Y.
Louis A. Rochat	Jersey City, N. J.
H. G. Palmer	Johnstown, N. Y.
W. M. Updegrave	Johnstown, Pa.
B. A. Soper	Malone, N. Y.
The Parker-Jones Co.	New Haven, Conn.
H. C. Watts	Syracuse, N. Y.
T. J. Arnston	Baker City, Ore.
J. B. Smyth	Renova, Pa.
Justin S. Dimon	Sayre, Pa.
F. A. Peiper	Covington, Ky.
J. A. McClure	Quebec, Can.
C. J. Hathaway	Pontiac, Mich.
W. K. Yen	Shanghai, China.
Weakley Ruth	Shelbyville, Tenn.

G. L. Schneider	Berkeley, Calif.
F. W. Martin	Nashua, N. H.
B. Golden	Carbondale, Pa.
Frank Idner	Palm Beach, Fla.
David Kletzky	Pueblo, Col.
W. B. Herrington	Belzoni, Miss.
Fred A. Woll	N. Y. City, N. Y.
E. C. Piper	Southbridge, Mass.
R. D. MacDonald	Wapakoneta, Ohio.
J. W. Brown	San Diego, Calif.
Harry F. Pitts	Kingston, N. Y.
H. Frank Freeman	West Chester, Pa.
Mark A. Endore	N. Y. City, N. Y.
H. G. Cook	Knoxville, Tenn.
Joseph Hagerty	Philadelphia, Pa.
W. G. Walton	Philadelphia, Pa.
August A. Lueck	Antigo, Wis.
Neil Weigand	Cleveland, Ohio.
T. Ben. Turnbaugh	Cape Giradeau, Mo.
A. B. Richards	Buhl, Idaho.
J. A. Pruzan	N. Y. City, N. Y.
E. M. Stearns	Chicago, Ill.
G. E. Spofford	Long Prairie, Minn.
Alice Henry	Pittsburgh, Pa.
V. B. Dixson	Chicago, Ill.
John T. Collins	Charleston, W. Va.
C. S. Hawkins	Rochester, N. Y.
Jesse Wolff	Spokane, Wash.
Ira B. Frantz	Iola, Kans.
E. T. Meyer	Pittsburgh, Pa.
I. W. Myers	Uniontown, Pa.
" " " For Public Library.....	" "
A. O. Wold	Grand Forks, N. Dak.
George H. Brown	Manchester, N. H.
J. F. Wing	Cincinnati, Ohio.

A. L. Correveau	Biddeford, Me.
A. D. Bliss	Albion, N. Y.
William Silver	Johnson City, Tenn.
J. N. Helman	Wilkinsburg, Pa.
J. M. Levy	Brooklyn, N. Y.
A. B. Jordan	Brattleboro, Vt.
G. B. Calder	Watertown, N. Y.
W. J. Van Essen	Pittsburgh, Pa.
Theodore F. Klein	Boston, Mass.
Eugene A. Picard	Pittsburgh, Pa.
Edwin H. Silver	Washington, D. C.
Milton Klein	Cincinnati, Ohio.
Byron Churchill	Oneida, N. Y.
J. Gray Collins	E. Liverpool, O.
Giuseppe Saporito	Toronto, Can.
Bernard Roling	Chicago, Ill.
M. R. Austin	Bronx, N.Y.C., N.Y.
Conrad E. Bauer	N. Y. City, N. Y.
R. D. Pratt	Harrisburg, Pa.
Chas. H. Sullivan	Camden, N. J.
W. F. McCaffrey	Riverside, N. J.
Marcus Rothschild	Philadelphia, Pa.
H. H. Horton	Cleveland, O.
Horace Kaplan	Detroit, Mich.
Burr Weaver	Chicago, Ill.
Cyrus Hummon	Chicago, Ill.
Eric G. Tavs	Chicago, Ill.
A. E. Norburg	Chicago, Ill.
George A. Rose	Chicago, Ill.
O. R. Engelmann	Chicago, Ill.
G. A. Youngdahl	Chicago, Ill.
Isodore Greenberg	Milwaukee, Wis.
O. A. Olson	Milwaukee, Wis.
C. S. Barrett	Freeport, Ill.
Archie E. Harte	Evansville, Wis.

M. C. Ingold	Milwaukee, Wis.
Jos. C. Goebel	Milwaukee, Wis.
Joseph Burstein	Milwaukee, Wis.
Harry C. Paul	Chicago, Ill.
E. K. Eliason	Duluth, Minn.
H. E. Pierce	Taunton, Mass.
Jos. Christopherson	Virginia, Minn.
C. W. Carstarphen	Denver, Col.
E. D. Gould	Toledo, Ohio
C. C. Rogers	Rochester, N. Y.
F. A. Stengel	Marion, Ohio
" " " For Public Library	Marion, Ohio
Nelson Y. Hull	N. Y. City
Beverly H. Gates	Detroit, Mich.
L. W. Wyckoff	Chagrin Falls, Ohio
Henry J. Evans	Albany, N. Y.
S. A. Darling	Hutchinson, Kans.
Richard Perlin	Utica, N. Y.
C. H. Tuck	Oshawa, Can.
L. H. Goldstein	Philadelphia, Pa.
E. H. Kiekanapp	Faribault, Minn.
J. M. Forsyth	Long Beach, Calif.
R. L. Ivy	Louisville, Miss.
J. R. Connelly	Detroit, Mich.
Fred Detmers	Los Angeles, Calif.
Charles R. Lenz	Springfield, Ill.
W. B. Irvine	Springfield, Ill.
J. Frank Wallace Inc	Decatur, Ill.
H. B. Schmith	Clinton, Ill.
Glenn E. Hovendon	Pekin, Ill.
Oscar V. Berry	Peoria, Ill.
Charles A. Faul	Philadelphia, Pa.
California Optical Co.	San Francisco, Calif.
Phillip Jackman	Union City, N. J.
S. E. Huston	Coshocton, Ohio
W. C. Ezell	Spartanburg, S. C.

Abraham L. Graubhart	Bronx N. Y. C., N. Y
A. D. Coon	Ada, Okla.
J. W. Browett	Toronto, Can.
Robert K. Parker	Barre, Vt.
Frank D. Larson	Atlantic, Iowa
T. S. Higginbotham	Abilene, Tex.
J. B. Sharkey	East Palestine, Ohio
S. L. McKee	Wilmington, Del.
Briggs S. Palmer	Boston, Mass.
Geo. S. Houghton	Boston, Mass.
R. F. Pray	Beaumont, Tex.
J. F. Earhart	Elkhart, Ind.
Detroit Society of Optometry	Detroit, Mich.
" For Public Library	Detroit, Mich.
W. E. Hipp	Detroit, Mich.
F. W. Haase	Detroit, Mich.
L. Goldsmith	Detroit, Mich.
T. J. Arneson	Minneapolis, Minn.
Will Pfaff	McKeesport, Pa.
" For Public Library	McKeesport, Pa.
Wm. L. Jenkins	Beverly, Mass.
Ellen L. Colley	Chicago, Ill.
J. Claire Manson	Jeannette, Pa.
Otto J. Haussmann	Philadelphia, Pa.
" For Public Library	Philadelphia, Pa.
Alex S. Cameron	Chicago, Ill.
S. M. Dotterer	Leipsic, Ohio
Frank I. Tibbetts	Little Rock, Ark.
David H. Pratt	N. Y. City, N. Y.
H. Riley Spitler	Eaton, Ohio
J. Fred Andreeae	Baltimore, Md.
Elmer LeRoy Ryer	N. Y. City, N. Y.
Ernest Petry	Rochester, N. Y.
E. Lewis Cannon	Philadelphia, Pa.
Ben H. Bohall	Oswego, N. Y.
G. H. Hutcheson	Charlottetown, P. E. I.

Charles Sheard	Rochester, Minn.
M. A. Stewart	Pasadena, Calif.
Hugh B. Cannon	
For Carnegie Public Library..	Fort Worth, Tex.
J. L. Wood	Graham, Tex.
G. C. Farrell	Moundsville, W. Va.
Louis Kuttner	San Francisco, Calif.
E. E. Berkander	Providence, R. I.
Frank. S. Balderson	Theresa, N. Y.
W. S. Farmer	Oklahoma City, Okla
Dudley L. Tice	Philadelphia, Pa.
John. J. McNally	Philadelphia, Pa.
Otto Vaitush	Chicago, Ill.
C. H. Nerbovig	Mankato, Minn.
Sherman W. Moody	Eugene, Ore.
Mrs. A. Jay Cross	Massillon, Ohio
S. C. Daugherty	Jeannette, Pa.
Clark Sloan	Cleveland, Ohio
Clement B. Edgar	Cleveland, Ohio
Oscar C. Smith	Rochester, N. Y.
Earl S. Smith	Utica, N. Y.
Edward O. Boquist	West New York, N. J
Geo. A. Huber	Lancaster, Pa.
Howard C. Doane	Boston, Mass.
Douglas A. Milward	Greenwich, Conn.
" " " For Public Library	Greenwich, Conn.
P. Boyle	Glens Falls, N. Y.
Madison Gilbert	Owosso, Mich.
B. Egbert Gurney	Newburgh, N. Y.
Bernard A. Baer	Washington, D. C.
Harry D. Williams	Cleveland, Ohio
Thomas J. Newlyn	Los Angeles, Calif.
Rochester Optometric Society	
For Public Library	Rochester, N. Y.
Arthur M. Kenney	Utica, N. Y.
B. T. Hoffman, M.D.	Chicago, Ill.

Edwin H. Etz	Washington, D. C.
P. Scholler	Hancock, Mich.
Milton Goodman	Rochester, N. Y.
Lavon J. Fattal	Owosso, Mich.
Geo. T. Bare	Chicago, Ill.
J. C. Strauss	Allentown, Pa.
John M. McKee	Chicago, Ill.
Geo. T. McVey	Oklahoma City, Okla.
S. W. Baker	Rockland, Mass.
Eugene Gawlik	Morristown, N. J.
J. Harcombe Cuff	London, England
E. E. A. For Optometry Library,	
Columbia University	N. Y. City, N. Y.
Optometric Weekly	Chicago, Ill.
Thomas G. Atkinson, M.D.	Chicago, Ill.
Optical Journal & Review	N. Y. City, N. Y.
Fredk. A. McGill	N. Y. City, N. Y.
Bausch & Lomb Optical Co.	Rochester, N. Y.
M. C. Williamson.....	Rochester, N. Y.
American Optical Co.	Southbridge, Mass.
H. C. Ray	Southbridge, Mass.
White Printing House	Chicago, Ill.
W. D. Bauman	Chicago, Ill.

CHAPTER XIII

Optometry's Practice Laws

A documentary history of optometry's legislative campaign would not be complete without spreading on the record a specimen of its laws. It would be manifestly impracticable to publish in these limited pages verbatim copies of all the fifty-odd optometry laws which grace the statute books in the United States and Canada. And it would be equally impracticable to attempt a composite digest of them all. Most of these laws, as they now stand, differ considerably in language and content, from those originally drafted and enacted. Time, experience, and changing conditions have brought riper wisdom and a broader understanding of the needs of the situation. Revisions have been made, clauses rescinded, amendments added, and in some cases the law has been entirely rewritten, to meet these new requirements; and it is more than likely that they will undergo still further changes in the future, as occasion arises.

There is no pretense that any of these optometry laws are perfect. No laws are; certainly no regulative laws. They are, in their very nature, organic things, which develop and improve with the growth of the social order. Nor can they, in the nature of things, be precisely the same for every State or province. Each commonwealth has its own conditions to be met and conformed with. If, therefore, for the purposes of this history, we select one optometry law, it is not to be construed as belittling or depreciating any of the rest, but simply that one must be chosen as a representative specimen.

The New York law is selected for reproduction here for the reason that in that State its passage and enactment encountered, perhaps, the most searching and exacting censorship, both hostile

and friendly, of any in the country, and therefore probably embodies the requirements of the situation to a very high degree of adequacy.

NEW YORK OPTOMETRY LAW

Optometry law passed 1908—Governor Chas. E. Hughes (Rep.)
As Amended 1923

Synopsis

Preliminary education, four years high school. Professional training three years study in registered optometrist's office or graduation from a school of optometry maintaining a satisfactory standard; licensing test by examination, registry with the Board of Regents and with the clerk of the county of residence. Reciprocity on presentation of suitable evidence. Opt.D. and D.O.S. degrees only conferred upon those with a degree of B.S. or B.A. For application address chief Examinations Division.

An Act to Amend the Public Health Law by Defining and Regulating the Practice Thereof.

(As Amended to the Close of Legislation 1919.)

The people of the State of New York, represented in Senate and Assembly, do enact as follows:

Article XV—Optometry

Section 300. A person practices optometry within the meaning of this article who by any means or methods, other than by the use of drugs, diagnoses any optical deficiency or deformity, visual or muscular anomaly of the human eye, or prescribes lenses, prisms or ocular exercises for the correction or relief of the same, or who holds himself out as being able so to do.

Sec. 301. State Board of Examiners.—The Board of Examiners in Optometry is continued. The members of said board now in office shall continue in office until the expiration of their respective terms. Such Board of Examiners shall consist of five persons appointed by the State Board of Regents, and shall possess sufficient knowledge of theoretical and practical optics to practice optometry, and shall have been residents of this state

actually engaged in the practice of optometry for at least five years.

The term of each member of said board shall be five years, or until his successor is appointed, and vacancies shall be filled for the unexpired term only.

Sec. 302. Powers of Board.—Said Board of Examiners shall, subject to the approval of the regents, make such rules and regulations not inconsistent with the law, as may be necessary for the proper performance of its duties; any member of the board may, upon being duly designated by the board, or a majority thereof, administer oaths or take testimony concerning any matter within the jurisdiction of the board.

Sec. 303. Examinations: Certificates of Practitioners.—Every person desiring to commence or to continue the practice of optometry after January 1, 1909, except as hereinafter provided, upon presentation of satisfactory evidence, verified by oath, that he is more than 21 years of age, of good moral character, has a preliminary education equivalent to at least two years in a registered high school, and after January 1, 1920, has graduated from a high school having a four-year course and registered by the board of regents as maintaining a satisfactory standing, or an education accepted by the regents as a full equivalent, and after receiving such preliminary education has prior to January 1, 1930, graduated from a school of optometry having a course of not less than two years and maintaining a standing satisfactory to the board of regents, and after January 1, 1930, has graduated from a school of optometry, conducted as a department of a university registered by the board of regents with either the degree of bachelor of arts or that of bachelor of science and a certificate of graduation in optometry, shall take an examination before the board of examiners to determine his qualifications. Every candidate successfully passing such examination shall be registered by said Board of Regents as possessing the qualifications required by this article, and shall receive from said Board of Regents a certificate thereof.

Applicants nineteen years of age certified as having satisfactorily completed the first two years of a four-year course of optometry in an optometry school registered as maintaining at the time a satisfactory standing, may be admitted conditionally to the examination in such subjects as are prescribed to be completed with such two years.

Any person who shall submit to the said Board of Examiners satisfactory proof as to his character, competency and qualifications and that he has been continuously engaged in the practice of optometry in this State for more than two years next prior to the time that Chapter 460 of the Laws of 1908 took effect, may upon the recommendation of said Board of Examiners receive from the Board of Regents a certificate of exemption from such examination, which certificate shall be registered and entitle him to practice optometry under the article. Every person who was, on the 21st day of May, 1908, when Section 209b of the Public Health Law, as then known, took effect, entitled to a certificate of exemption as therein provided, but who failed or neglected to make application therefor and present evidence to entitle him thereto, on or before January 1, 1909, as provided by said section, must make such application and present such evidence on or before July 1, 1909, or he shall be deemed to have waived his right to such certificate. If any person whose registration is not legal or who is not registered because of some error, misunderstanding or unintentional omission, shall submit to the State Board of Examiners in Optometry, or to the Regents of The University of the State of New York, satisfactory proof that he had all the requirements prescribed by law at the time required for registration and was entitled to be legally registered, he may, on unanimous recommendation of the State Board of Examiners in Optometry, or by action of the Board of Regents, receive from the Regents under seal a certificate of the facts which may be registered by any county clerk and shall make valid the previous imperfect registration and such certificate shall include the date on which such person could or should have registered, and his registration shall be deemed

to have been valid and corrected from that date. Before any certificate is issued it shall be numbered and recorded in a book kept in the Regent's office and its number shall be noted upon the certificate. A photograph of the person registered shall be filed with the record and a duplicate thereof affixed to the certificate. In all legal proceedings the record and photograph so kept in the Regent's office or certified copies thereof shall be *prima facie* evidence of the facts therein stated. For the purpose of changing the status of an optometrist licensed by exemption to that of one licensed by examination, the Regents may in their discretion admit to examination any optometrist duly licensed by exemption, who in lieu of the preliminary and professional requirements prescribed, presents satisfactory evidence that he has continuously and in conformity to law practiced optometry in the State of New York for a period of not less than ten years.

No person shall be deemed eligible to make application for a certificate of exemption or a certificate of fact after January 1, 1923.

Upon the recommendation of the board, the Regents may also without the examination herein provided, indorse a certificate to practice optometry in any other state or country granted after examination by a legally constituted board of examiners in optometry upon payment of the statutory fee by the applicant and provided that his preliminary and professional education shall have been not less than those required by this State, and provided that he shall have been in reputable practice continuously for not less than five years immediately next preceding his application.

Sec. 303-a. Degrees.—No degrees in optometry shall be conferred in this State except the degrees of doctor of optometry (Opt. D.) or doctor of optical science (D.O.S.).

The doctor of optometry and doctor of optical science degrees shall not be conferred upon any person who has not received either a bachelor of arts degree or a bachelor of science degree accompanied in either case with a certificate of

graduation in optometry, and who has not thereafter completed a course of two years graduate study of the subject of optics and optometry.

Nothing in this article shall affect the standing of any degrees in optometry conferred prior to the amendment of this act.

Sec. 304. Certificates to be Recorded and Displayed.— Every person to whom a certificate of either registration or exemption, shall be issued shall immediately cause the same to be recorded in the clerk's office in the county of his residence, and also in the clerk's office of each other county wherein he shall then practice or thereafter commence the practice of optometry; and no registration in a county clerk's office thereafter shall be necessary. Every person practicing optometry shall annually in the month of June report under oath to the State Board of Examiners any facts required by the Board, shall pay to the Regents a registration fee of \$2 and shall receive a certificate of registration which must be conspicuously displayed together with his original certificate of registration or exemption in a conspicuous place in the principal office wherein he practices optometry and, whenever required, exhibit such certificate to said board of examiners or its authorized representatives. Before the first day of June of each year the secretary of the Board shall mail to every optometrist registered in the State of New York a blank application for reregistration, addressing the same in accordance with the post office address given at the last previous registration. Upon receipt of such application blank, which shall contain space for the insertion of his name, office and post office address, date and number of his license, and such other information as the Regents may deem necessary, he shall sign and forward this statement and application for renewal of his registration certificate to the secretary of the Board together with a fee of \$2. Upon receipt of such application and fee, and having verified the accuracy of the same by comparison with the applicant's initial registration statements the secretary of the

Board shall issue a certificate of registration which shall render the holder thereof a legal practitioner of Optometry for the ensuing year.

These certificates of registration shall all bear date of July 1st of the year of issue, and shall expire on the thirtieth day of June in the year following. Applications for registration therefore must be made during the month of June of each year, and if not so made an additional fee of \$1 for each 30 days of delay beyond the first day of July and up to the first day of January, shall be added to the regular fee. On the first day of October of each year, or within 10 days thereafter, the secretary of the board shall publish and mail to every registered optometrist in the State of New York a printed list of the legally registered optometrists within the State, and each published list shall contain at the beginning thereof these words:

“Each registered optometrist receiving this list is requested to report to the secretary of the Board the name and address of any persons known to be practicing optometry, whose names do not appear in this registry. The names of persons giving such information shall not be divulged.” If any optometrist continues to practice optometry without registration as herein provided his license may be suspended or revoked by the Regents, in accordance with the provisions of this section. If any practitioner of optometry should fail to register in time for the appearance of his name in the published list of registered optometrists, in accordance with the provisions of this act the Regents shall notify said delinquent to appear before them at an appointed time and place, and if his explanation of his failure to have registered shall be satisfactory to the Regents, he may be reinstated and his name added to the registry; and the Regents may also at their option remit the additional fees accruing because of delay in registering. But should the delinquent’s explanation prove unsatisfactory, the Regents may suspend the person from the practice of optometry for a limited season; or the Regents may revoke the person’s license.

An optometrist who has been heretofore duly licensed and registered to practice in this State whose license shall not have been revoked or suspended, and who either before or after registration as required by this section as hereby amended, shall have temporarily abandoned the practice of optometry or removed from the State, may register within this State, upon complying with the provisions of this section for reregistration and also filing with the secretary of the Board his affidavit of such facts.

Whenever practicing said profession of optometry outside of, or away from, said office or place of business, he shall deliver to each customer or person so fitted with glasses, a bill of purchase, which shall contain his signature, home post office address, and the number of his certificate of registration or exemption, together with a specification of the lenses furnished and the price charged therefor.

Sec. 305. Fees.—The fee for such examination shall be \$15; for a certificate of registration, \$10, and for a certificate of exemption, \$5; for annual registration, \$2.00; for any certificate of fact required of a student apprentice, \$1.00; and all fees and fines required or imposed by the provisions of such articles or rules shall be paid to the Board of Regents and constitute a fund for expenses made necessary by this article. All fees, fines and penalties shall be paid into the state treasury and the legislature shall annually appropriate therefrom for the education department an amount sufficient to pay all proper expenses incurred pursuant to this article. The fee to be paid to the county clerk for recording an original certificate shall be 50 cents.

Sec. 306. Revocation of Certificate.—The Board of Regents shall have power to revoke any certificate of registration or exemption granted by it under this article, the holder of which is guilty of any fraud, deceit or misrepresentation in his practice or in his advertising, has been convicted of crime, or is an habitual drunkard, or grossly incompetent to practice optometry. Proceedings for revocation of a certificate or the

annulment of registration shall be begun by filing a written charge or charges against the accused. These charges may be preferred by any person or corporation, or the regents may on their own motion direct the executive officer of the Board of Regents to prefer said charges. Said charges shall be filed with the executive officer of the Board of Regents, and a copy thereof filed with the secretary of the Board of Optometry Examiners. The Board of Optometry Examiners, when charges are preferred, shall designate three of their number as a committee to hear and determine said charges. A time and place for the hearing of said charges shall be fixed by said committee as soon as convenient, and a copy of the charges, together with a notice of the time and place when they will be heard and determined, shall be served upon the accused or his counsel, at least 10 days before the date actually fixed for said hearing. Where personal service or service upon counsel cannot be effected, and such fact is certified on oath by any person duly authorized to make legal service, the regents shall cause to be published for at least seven times, for at least 20 days prior to the hearing, in two daily papers in the county in which the optometrist was last known to practice a notice to the effect that at a definite time and place a hearing will be had for the purpose of hearing charges against the optometrist upon an application to revoke his certificate. At said hearing the accused shall have the right to cross examine the witnesses against him and to produce witnesses in his defense, and to appear personally or by counsel. The said committee shall make a written report of its findings and recommendations, to be signed by all its members, and the same shall be forthwith transmitted to the executive office of the Board of Regents. If the said committee shall unanimously find that said charges, or any of them are sustained, and shall unanimously recommend that the certificate of the accused be revoked or his registration be annulled, the regents may thereupon, in their discretion, revoke said certificate or annul said registration, or do both. If the regents shall annul such registration, they shall forthwith transmit to the clerk of

the county or counties in which said accused is registered as an optometrist a certificate under their seal certifying that such registration has been annulled, and said clerk shall, upon receipt of said certificate, file the same and forthwith mark said registration "Annulled." Any person who shall practice optometry after his registration has been marked "Annulled" shall be deemed to have practiced optometry without registration. Where the certificate of any person has been revoked, or his registration has been annulled as herein provided, the regents may, after the expiration of one year, entertain an application for a new certificate, in like manner as original applications for certificates are entertained; and upon such new application they may in their discretion exempt the applicant from the necessity of undergoing any examination.

Sec. 307. Violations of Articles.—No person not a holder of a certificate of registration or exemption duly issued to him and recorded as above provided shall, after January 1, 1909, practice optometry within this State. No person shall falsely personate a registered optometrist of a like or different name, nor buy, sell or fraudulently obtain a certificate of registration or exemption issued to another. Practicing or offering to practice optometry, or the public representation of being qualified to practice the same by any person not authorized to practice optometry, shall be sufficient evidence of a violation of this article. And the holder of a certificate of registration or exemption practicing optometry, and having one or more places of business shall be equally liable for violations of this article by any apprentices or unlicensed employes. No person practicing or offering to practice optometry shall publicly represent himself to be a doctor, or shall assume the title of doctor or use such title or any abbreviation thereof in his practice, unless the right to use the same has been conferred upon him by some duly authorized college or university, prior to the taking effect of this act. Any violations of the provisions of this article shall be a misdemeanor and courts of special sessions shall have jurisdiction of all such violations, and any

person violating any of the provisions of this article or any rule of the Regents of the University relating to the practice of optometry and not inconsistent with the law shall be guilty of a misdemeanor and shall on conviction thereof be punished for a first offense by a fine of not less than fifty dollars nor more than two hundred and fifty dollars or by imprisonment for not more than three months or by both such fine and imprisonment, and for a second or subsequent offense by a fine of not less than two hundred and fifty dollars nor more than five hundred dollars or by imprisonment for not more than six months or by both such fine and imprisonment. Each act constituting a violation of this article shall be deemed to be a separate act, and the person guilty thereof shall be subject to a penalty of one hundred dollars for such act. A right of action for the recovery of a penalty under this act may be settled or compromised by the attorney-general, either before or after proceedings are brought to recover such penalty and prior to the entry of judgment therefor. The penalties hereby imposed for a violation of the provisions of this article shall not in any way affect the liability of a person to punishment for a violation of this article upon prosecution therefor in a court of criminal jurisdiction. All prosecutions under this act shall be made by the attorney-general in the name of the people of the States and all fines and penalties may be paid to the Board and such penalties may be sued for and recovered in the name of the people of the state in an action brought therefor by the attorney-general. All violations of this act when reported to the Regents and duly substantiated by affidavits or other satisfactory evidence shall be investigated and if the report is found to be true and the evidence substantiated the Regents shall report such violations to the attorney-general and request prompt prosecution. The Regents may appoint such inspectors as are necessary to be paid from the funds received under this act at such salaries as they may determine for the purpose of the investigation of such violations.

Sec. 308. Construction of Article.—Nothing in this article shall be construed to apply to duly licensed physicians authorized to practice medicine under the laws of the State of New York nor to persons who neither practice nor profess to practice optometry, who sell spectacles, eye glasses or lenses either on prescription from such physicians or from such duly qualified optometrists, or as merchandise from permanently located and established places of business.

CHAPTER XIV

Optometry's State Board Examinations

It is not pretended, of course, that a set of examination questions and their answers, even though those answers show a high average of correctness, represent the last word in the qualifications of a candidate, in any profession, to practise that profession. Every educator knows that it is quite possible for a student to give almost perfect answers to an examination paper, and yet prove to be a very mediocre practitioner; and, on the other hand, to make a poor showing in a written examination and still possess an excellent working knowledge of the subject which renders him a highly successful practitioner.

Nevertheless, whatever the examination may indicate as to the individual candidate and his qualifications,—which is sheerly a matter of personality,—it cannot be denied that the nature and scope of the questions set, and the answers required, in a State board examination are an indication of the standard of education and fitness demanded of those who seek the right to practice their profession under the regulations and requirements of the State. And since, as Governor Hughes pertinently pointed out, the carrying out of State regulation devolves, after all, on the membership and organization of the regulated profession itself, they also indicate, by inference, the standards erected and maintained within the profession.

From this viewpoint it is fitting that this historic record of optometry's development, and its function as the custodian of human vision, should contain a representative set of State board examination questions, showing the high standard of qualification required of those to whom is entrusted, in the profession of optometry, the scientific care of the people's

eyesight. The questions here presented are taken, verbatim and in toto, from the actual examination paper of an Optometry State Board of Examiners.

NEW YORK STATE EXAMINATION QUESTIONS

At the 53rd optometry examination given by the University of the State of New York, Sept. 21-24, questions in the various subjects were as follows:

Theoretic Optics—Part I

Monday, Sept. 21, 1925—9.15 A. M. to 12.15 P. M., Only

The Theoretic Optics paper consists of part I and part II.

Answer a total of five of the questions on this paper but no more. Calculations leading up to the answers must be given in full in each case.

Candidates must answer each of the first three questions.

Discuss the formation of a shadow cone and differentiate between umbra and penumbra. Illustrate fully by drawings.

Describe fully the pinhole camera. Illustrate by a drawing.

Assuming that the eye is placed on the axis of a spheric mirror and that the rays are paraxial, explain how the field of view is determined. Draw accurate diagrams for concave and convex mirrors.

Candidates must answer two of the following questions but no more.

Assuming that the apparent diameter of the sun is 30', calculate the approximate diameter of the sun's image in a concave mirror of focal length 1 foot.

Define the following terms as applied to a spheric mirror: (a) pole, (b) aperture, (c) principal section, (d) principal axis.

Name the seven primary colors of the solar spectrum, beginning with the color most refracted.

Note—Numerical answers, when called for, must be correct to the second decimal place.

Theoretic Optics—Part II

Monday, Sept. 21, 1925—1.15 to 4.15 P. M., Only

Answer a total of five of the questions on this paper but no more. Calculations leading up to the answers must be given in full in each case.

Candidates must answer each of the first three questions.

A person with a window behind him, on looking into a convex lens, sees two images of the window. Describe the character and mode of formation of these images.

What is meant by the aperture of a lens? What effect has the aperture of a lens on (a) the definition of the image that the lens is used to form, (b) its brightness?

Describe how light may be plane polarized by successive refractions. Illustrate by diagram.

Candidates must answer two of the following questions but no more.

The diameter of a thin convex lens is 1 inch and its focal length is 10 inches. The lens is placed midway between the eye and a plane object that is 10 inches from the eye. How much of the object is visible through the lens?

A thin lens is made of glass of index n . If the focal length of the lens in air is a and if its focal length in a liquid is b , show that the index of refraction of the liquid is

$$\frac{bn}{b+a}$$

$$\frac{b+a}{b} (n-1)$$

A farsighted person can see distinctly only at a distance of 40 cm. or more. How much will his range of distinct vision be increased by using convex spectacle lenses of focal length 32 cm.?

Note—Numerical answers, when called for, must be correct to the second decimal place.

Theoretic Optometry

Tuesday, Sept. 22, 1925—9.15 A. M. to 12.15 P. M., Only

Answer a total of 10 of the questions on this paper but no more.

Candidates must answer each of the first six questions.

State the function of the pinhole disc. Give several of its useful applications.

In the horizontal meridian the mires of an ophthalmometer are seen contiguous; in the vertical meridian they overlap. Is the astigmatism with or against the rule?

With the point of fixation at infinity, the point of reversal is at 1 meter; what is your diagnosis?

What is the theory of muscle exercise?

What is the theory involved in fitting a hyperope with glasses that slightly blur his distance vision?

How would you determine whether a diplopia is due to muscular insufficiency or to a disease?

Candidates must answer four of the following questions but no more.

What does the distance between the far point and the near point measure?

Differentiate between range of accommodation and amplitude of accommodation.

What means would you employ to determine (a) facultative hyperopia, (b) clonic spasm, (c) asthenopia?

Discuss the theoretic value of the duction tests.

Discuss the theory of the use of the Maddox rod.

Discuss the theory of fitting with bifocals a 20-year-old myope of 8 D.

Practical Optometry

Tuesday, Sept. 22, 1925—1.15 to 4.15 P. M., Only
Answer a total of 10 of the questions on this paper but no more.

Candidates must answer each of the first six questions.

Name the tests that should be employed in making a complete and accurate examination of the eyes. Make a complete record of a hypothetical case.

Describe an accurate subjective method of detecting astigmatism and determining its character.

In static skiametry, the examiner, working at 1 meter, finds

that a + 1.50 D. sph. neutralizes the shadow movement in the vertical meridian and a + 2 D. sph. neutralizes the shadow movement in the horizontal meridian. State the character of the refractive error and write a prescription for the correcting lenses.

In dynamic skiametry, with fixation and observation at $\frac{1}{2}$ meter, it is found that a + 1 D. sph. neutralizes the shadow movement in the vertical meridian and that the horizontal meridian is neutralized by the same plus power with fixation at $\frac{1}{2}$ meter and observation at 1 meter. (a) State the amount of ametropia presented at the working distance. (b) For a patient 20 years of age what correction would you feel justified in prescribing?

How may one quickly differentiate with the ophthalmometer between symmetry and asymmetry of the cornea? Show two ways of recording ophthalmometric findings.

Describe fully your method of measuring the relative strength of the extrinsic muscles of the eye.

Candidates must answer four of the following questions but no more.

Discuss the differences you have observed in the appearance of the retina of an eye as seen by the direct and the indirect method of ophthalmoscopy.

When testing at 20 feet with a Maddox rod before the right eye, the line of light is seen 36 cm. to the right of the white object point. State the kind and the amount of the phoria. What should be the strength of the prism and how should the prism be placed to bring the line through the white spot?

What objective method of examination will indicate the presbyopic correction? Explain.

Describe two methods of measuring the visual field.

Describe your procedure in testing a case of compound astigmatism with the stenopaic disc.

A child 10 years of age who has never worn glasses is found to have 3.50 D. of hyperopia and 5 degrees of esophoria. Write a prescription for the glasses you would prescribe.

Anatomy, Physiology and Pathology of the Eye

Wednesday, Sept. 23, 1925—9.15 A. M. to 12.15 P. M., Only

Answer a total of 10 of the questions on this paper but no more.

Candidates must answer each of the first six questions.

Name the opening through which each of the following passes into the orbit: (a) second cranial nerve, (b) sixth cranial nerve, (c) ophthalmic vein, (d) supraorbital vessels, (e) anterior ethmoidal vessels.

Describe the superior oblique extrinsic muscle.

Give the physiology of the choroid.

Discuss each of the following: (a) the ciliary processes, (b) the ciliary muscle.

Describe the appearance of a cortical cataract when viewed with an ophthalmoscope.

Give the first aid treatment in the case of an alkali burn on the cornea.

Candidates must answer four of the following questions but no more.

Name the optic nerve fibers that run through the chiasm.

How is the cornea nourished?

How does the retina receive its nourishment?

By what route does the aqueous humor get into the venous circulation of the eye?

Describe in detail the iris.

(a) What are the symptoms of iritis? (b) How does it affect vision?

Physiologic Optics

Wednesday, Sept. 23, 1925—1.15 to 4.15 P. M., Only

Answer a total of 10 of the questions on this paper but no more.

Candidates must answer each of the first six questions.

Is the index of refraction of the crystalline lens uniform throughout the entire lens? Explain.

What part of the eye is affected most in dynamic refraction?

Why may visual acuity be better in an eye with 1 D. of hyperopia than in one with the same amount of myopia?

What must be the size of an object in order to be interpreted by the retina?

Discuss the rotations of the eye by the extrinsic muscles.

Define cyclophoria.

Candidates must answer four of the following questions but no more.

Discuss binocular perception of depth.

How is visual acuity measured and recorded?

On what does the angle of convergence depend?

Locate the punctum proximum at each of the following ages: 20 years, 30 years, 40 years.

Explain how a hyperope may become myopic in old age.

Why does anisometropia affect comfortable binocular vision?

Practical Optics

Thursday, Sept. 24, 1925—9.15 A. M. to 12.15 P. M., Only

Answer a total of 10 of the questions on this paper but no more. Candidates must answer each of the first six questions.

How may lenses of the same power be obtained from different kinds of glass, the index of refraction varying in each case?

Two lenses having the same index of refraction with curvatures of the same character and equal respectively one to the other, show unequal power; what mechanical difference in these two lenses would produce this optical result?

Explain the term "vertex focal distance."

Draw a diagram of a thick lens illustrating the difference between the principal focal distance of the lens and its vertex focal distance. Explain fully.

Draw a diagram of what is commonly known as a saddle spectacle bridge. Explain the standard system of notation used to designate the different sizes and shapes of this form of bridge.

Give a rule for transposing the formula of a compound lens.

Candidates must answer four of the following questions but no more.

Give three examples illustrating the rule given in answer to question 6.

What is the refractive index of Canada balsam (solid)?

What decentration will it be necessary to make in a 4 D. spheric lens in order to obtain in combination the equivalent of a $2\frac{1}{2}$ prism-diopter?

Illustrate by diagram each of the following forms of bifocal lenses and explain the mechanical construction of each:
(a) cemented bifocal, (b) solid bifocal, (c) fused bifocal.

Describe the difference in process in grinding the spheric surface and the toric surface of a lens.

The wearer of moderately strong convex lenses complains that while vision is clear with them, the floor and walk appear to be considerably raised; what change or changes in the adjustment of the lenses would tend to overcome the annoyance complained of?

CHAPTER XV

Optometry's University Education

It would have availed but little, either in her own or in the public interest, if optometry had been content to wage her fight for legal recognition, and, having won it, to rest complacently on her laurels. She could not long have retained her hard-won status by such a course, and she would not have deserved to do so. In order to keep faith with herself and the public, it behooved optometry to build up within her professional organization an adequate educational system to maintain the prestige that she claimed and the service that she pledged.

Even before legislation was sought and obtained, there were in this country and Canada several schools of optometry, most of which, even at that time, were giving a greater number of hours by far to the study of the theory and practice of ocular refraction than were given in the curriculum of any medical college. With the enactment of the optometry laws in the various States, from year to year, the educational requirements, raised to a much higher standard, were written into the laws themselves. These provided for the completion of an accredited high school course, with special stress upon the subjects essential to the practice of optometry, and an attendance course of not less than two years in an approved school or college of optometry, representing at least 2000 hours of actual work in the theoretical and practical branches of optometry.

The following minimum requirements are taken from the Minnesota law, which, as previously stated, was the first to be enacted:

Ocular anatomy	125 hours
Ocular pathology	125 hours

General anatomy	150 hours
General physiology	100 hours
General mathematics	150 hours
General physics	100 hours
General optics	100 hours
Theoretical optics	300 hours
Practical optics	100 hours
Theoretical optometry	250 hours
Practical optometry	200 hours
Hygiene	50 hours
Psychology	50 hours
Optical laboratory	100 hours
Clinical work	100 hours

In the course of study here outlined, it was stipulated that the hours required should be actual work in the class room, laboratory or clinic, and that at least eighty per cent of actual attendance should be made, and that the course should be so arranged as to require two years of actual attendance at the school for its successful completion.

This schedule of educational requirements is representative of the status established under all of the optometry laws, as they went into effect. As fast as possible, the reputable schools and colleges of optometry throughout the country, under the stimulus and with the cooperation of optometrical organization, adjusted themselves to the new order; and in a phenomenally short time, one might say a record time, much shorter than in the history of any other profession or applied science, had in operation a body of efficient education whose standards measured up, in their kind, to those of any other learned profession.

The standards thus created have been improved in their outworking from year to year. Some of the schools, which were unable to meet the higher requirements, went out of existence, or were merged with larger institutions. The schools themselves have cooperated loyally and wholeheartedly in the scheme of advancement. They did not wait to be drafted; they volunteered at the first call, and have willingly, nay eagerly, cooperated at every step. And it must be apparent that

their readiness to reorganize and to meet the new demands of the occasion entailed both sacrifice and effort, which has always been forthcoming.

As stated, the number of schools has no doubt decreased, which was inevitable, and, it may be added, salutary. But those that survived are stronger and better than ever, worthy of the important role they play in the uplift of the profession and the betterment of humanity. They are, after all, the foundation and bulwark of scientific optometry. To them optometry must look for its future prestige.

Particularly worthy of mention, among these institutions, is the Northern Illinois College of Optometry, which is represented by a large body of graduates in practice throughout this country and Canada, many of them highly successful optometrists and distinguished members of their profession.

Another, which merits a place in this history, is the Pennsylvania College of Optometry, incorporated under the laws of that State. The foundation of this college was the outcome of public-spirited contributions from many optometrists, and the institution is at the present time graduating some of the most proficient practitioners in America.

The Rochester School of Optometry was formerly a highly creditable independent institution, but at the time of writing plans are in the making for taking over this school and its equipment as a part of the University of Rochester, which, for the first time in its history, is extending its scope to include medical, dental and optometric departments.

In addition to the independent schools of optometry, chairs and courses have been installed in four of the great universities of the country,—in Columbia University, of New York, Ohio State University, the University of California, and the University of Illinois. The courses and requirements laid down in these institutions are indicative of the high standards which prevail in optometric education at the present day.

Columbia University

The new curriculum at Columbia University, which was

inaugurated to conform to the amendment of the New York optometry law to go into effect January 1, 1930, is a course analogous to other four-year professional courses in the institution. It occupies a student's entire time during the four years, as the minimum number of required points is 133. It is under the control of a Committee of the University Council, and leads to a degree of Bachelor of Science and a Certificate of Graduation in Optometry.

The two-year course hitherto offered, leading to the certificate of graduation only, will be continued at least until 1928-1929. After 1929 this course will no longer meet the New York State requirements. With the advanced standards of instruction set by the four-year course, the work required in the two-year course will make greater demands upon the student than formerly.

According to a provision of the New York State Optometry Law, no student can be permitted to register for the professional courses in optometry in Columbia University unless he "has graduated from a high school having a four-year course and registered by the Board of Regents as maintaining a satisfactory standing" or unless he has had "an education accepted by the Regents as a full equivalent." The fulfillment of this necessary preliminary requirement must be officially guaranteed by a qualifying certificate issued by the New York State Department of Education.

The entrance requirements to the course are as follows, with a total requirement of 15 units:

Prescribed Subjects	Units
English	3
Elementary and Intermediate Algebra	2
Plane Geometry	1
Physics	1
Latin, French, German, Spanish or Italian	3
For men, History	1
For women, a second foreign language	2

Elective Subjects

Any of the following, provided they have not already been offered among the prescribed subjects:

	Units		Units
Latin 2, 3 or 4 years	2, 3 or 4	English History	1
Greek 2 or 3 years.....	2 or 3	American History	1
French 2, 3 or 4 years ...	2, 3 or 4	Biology	1
German 2, 3 or 4 years ...	2, 3 or 4	Botany	1
Italian 2 or 3 years	2 or 3	Chemistry	1
Spanish 2, 3 or 4 years ...	2, 3 or 4	Physiography	1
Solid Geometry	½	Zoölogy	1
Advanced Algebra	½	Drawing, Mechanical or Freehand	1
Trigonometry	½	Shopwork	1
Ancient History	1	Social Science	1
European History	1		

The detailed curricula, the four-year and the two-year, are as under:

FOUR-YEAR CURRICULUM

Leading to the Degree of Bachelor of Science

This is the course that every student is now advised to pursue who wishes to be a professional optometrist in the true meaning of that term. It comprises a preliminary program of studies in **Columbia or Barnard College** covering the first two years, followed by a two-year program of professional studies under the administrative direction of the University Council. The preparatory collegiate studies do not necessarily have to be pursued in Columbia University, provided the student can obtain the equivalent training in some other recognized institution of learning; but as a general rule he is likely to find that it will be much simpler for him to spend four years at Columbia University and do all the required work there. For credit work done elsewhere he should correspond with Professor A. L. Jones, Director of Admissions. In the following outline the courses for the first two years are those given in Columbia College. The courses in Barnard College for women vary slightly from those in Columbia College for men. Professor H. W. Farwell, 1218 Physics Building, is collegiate adviser for students in Columbia College, and Professor Grace Langford, 232 Fisk Building, for students in Barnard College.

The purely *professional studies* in this course are begun in the third year, and in the fourth year every subject has a more or less direct bearing on professional optometry.

First Year—In Columbia College

Winter Session	Points	Spring Session	Points
English A1	3	English A2	3
'German B1	4	'German B2	4
Contemporary Civilization A1 .	5	Contemporary Civilization A2	5

Mathematics A1 (trigonometry) 2	Mathematics A6 (solid geometry) 3
Physical Education A1 and A3 2	Physical Education A2 1

Total 16

Total 16

Second Year—In Columbia College

<i>Winter Session</i>	<i>Points</i>	<i>Spring Session</i>	<i>Points</i>
Physics B1	4	Physics B2	4
Mathematics 21	3	Mathematics 24 (calculus)....	3
(Analytical geometry)			
Psychology 1	3	Psychology 2	3
German 5 (or French)	3	German 6 (or French)	3
Chemistry A1	4	Physiology 2	2
Physical Education B1	1	Physical Education B2	1

Total 18

Total 16

'There is so much valuable optical literature in German that of all modern foreign languages this is the most essential for a student who is planning to be an optometrist. However, in special cases, provided the student has already studied German sufficiently before coming to college, equivalent courses in French may be approved for substitution here for German.

Third Year—Under University Council

<i>Winter Session</i>	<i>Points</i>	<i>Spring Session</i>	<i>Points</i>
Physics 21	4	Physics 22	4
(Geometrical optics)		(Geometrical optics)	
Drafting 1	2	Physics 26 (Physical optics)	2
Optometry 35	3	Optometry 36	3
(Anatomy and physiology of the eye)		(Anatomy and physiology of the eye)	
Optometry 37	2	Optometry 38	2
(Theory of optometry)		(Theory of optometry)	
Optometry 41	1	Optometry 42	1
(Practice of optometry)		(Practice of optometry)	
		Optometry 30	2
		(Optical shopwork)	

And in addition, electives in the Winter and Spring Sessions, to be chosen ordinarily from the following subjects, so that the total number of points for each half-year will not be less than 16 nor more than 18:

	<i>Points</i>
Zoölogy 1 (General biology and invertebrate zoölogy)	5
Philosophy 1 (Introduction to reflective thinking)	3
Economics 1-2	6

Geology 2 (Historical geology)	3
Geography 1-2	6
Physiology 6 (Laboratory course)	2
Chemistry 3	6
Sociology 3-4	6

Fourth Year—Under University Council

<i>Winter Session</i>	<i>Points</i>	<i>Spring Session</i>	<i>Points</i>
Physics 23	4	Optometry 24	3
(Advanced geometrical optics)		(Geometrical and spectacle optics)	
Physics 27	3	Physics 28	2
(Physiological optics)		(Physiological optics)	
Optometry 31	2	Optometry 32	2
(Optical shopwork)		(Optical shopwork)	
Optometry 39	3	Optometry 40	3
(Theory of optometry)		(Theory of optometry)	
Optometry 43	4	Optometry 44	4
(Practice of optometry and optometrical laboratory)		(Practice of optometry and optometrical laboratory)	
Optometry 45	2	Optometry 46	2
(Pathological conditions of the eye)		(Pathological conditions of the eye)	
—		—	
Total 18		Optometry 50	
		1 (Conservation of vision)	
		Total 17	

The total number of points for the entire four years should not exceed 140.

See the current **Announcement of Columbia College** for detailed description of the contents of prescribed college courses in this curriculum; and also current **Announcement of Barnard College** for description of equivalent college courses for women. See following pages of this Announcement for description of the contents of the **professional courses** in the second and third year.

TWO-YEAR CURRICULUM

Leading to the Certificate of Graduation Only (See page 9)

Although this briefer course does not pre-suppose any college training, the professional studies are very nearly the same as in the longer course; and a student who has not had this previous preparation will be at a disadvantage as compared with more advanced students for whom this instruction is primarily intended. The program in the two-year curriculum, which is exclusively under the administration of **University Extension**, is as follows:

First Year—In University Extension

<i>Winter Session</i>	<i>Points</i>	<i>Spring Session</i>	<i>Points</i>
Optometry 19	3	Optometry 30	2
(Elementary mathematics)		(Optical shopwork)	
Physics B1	4	Physics B2	4
(General elementary physics)		(General elementary physics)	
Physics 21	4	Physics 22	4
(Geometrical optics)		(Geometrical optics)	
Optometry 35	3	Optometry 36	3
(Anatomy and physiology of the eye)		(Anatomy and physiology of the eye)	
Optometry 37	2	Optometry 38	2
(Theory of optometry)		(Theory of optometry)	
Optometry 41	1	Optometry 42	1
(Practice of optometry) —		(Practice of optometry) —	
	Total 17		Total 16

Second Year—In University Extension

<i>Winter Session</i>	<i>Points</i>	<i>Spring Session</i>	<i>Points</i>
Physics 23	4	Optometry 24	3
(Advanced geometrical optics)		(Geometrical and spectacle optics)	
Physics 27	3	Physics 28	2
(Physiological optics)		(Physiological optics)	
Optometry 31	2	Optometry 32	2
(Optical shopwork)		(Optical shopwork)	
Optometry 39	3	Optometry 40	3
(Theory of optometry)		(Theory of optometry)	
Optometry 43	4	Optometry 44	4
(Practice of optometry)		(Practice of optometry)	
Optometry 45	2	Optometry 46	2
(Pathological conditions of the eye) —		(Pathological conditions of the eye) —	
	Total 18		Total 16

Ohio State University

The course in optometry in this institution is catalogued as Applied Optics, and described as follows:

"The course of study in Applied Optics offers a thorough training in theoretical and practical optics, and the application of optical principles to the correction of visual errors, with clinical practice in both the refractive and the pathological field. The

curriculum covers four years, and leads to the degree, Bachelor of Science in Applied Optics.

"To obtain full standing, an applicant must be a graduate of a high school of the first grade, or receive credit by examination for fifteen units.

"Of these fifteen units, not less than three shall be in English; one in American History and civics; one in algebra; one in geometry; four in foreign language; one in physics or chemistry; one in botany, zoology, or physiology; and three shall be elective."

University of California

In this institution, students who plan to complete the curriculum in optometry are required to meet the following requirements:

"They must enroll in the College of Letters and Science, and must satisfy all entrance, junior certificate, and graduation requirements of that college, with physics-optometry as a major subject. The professional courses will be offered in the third and fourth year of the curriculum. As prerequisites, students should offer the following high school subjects for matriculation: chemistry, physics, trigonometry, mechanical drawing, and three years of foreign language (preferably German).

"The following program represents the most satisfactory arrangement of work to meet the requirements of Bachelor of Arts and the certificate of completion of the curriculum in optometry:

	<i>Freshman Year</i>	Units 1st sem.	Units 2d sem.
Subject A			
Military Science 1A-1B.....	1½ or 0	1½ or 0	
Physical Education	½	½	
Physiology 1	5	..	
English 1A-1B	3	3	
Mathematics 5 .....	..	3	
Physics 1A-1B	3	3	
Foreign Language	3	3	
Elective	0 or 1½	2 or 3½	
 Total	 16	 16	

Sophomore Year

Military Science 2A-2B	1½ or 0	1½ or 0
Physical Education	½	½
Economics 1A-1B	3	3
Mathematics 8A-9B	3	3
Physics 1c-1d	3	3
Chemistry 1A-1B	5	5
Elective	0 or 1½	0 or 1½
	16	16

Junior Year

American Institutions 101 .....	..	2
Anatomy 102 .....	..	3
Physics 108A-108B	3	3
Physics 105A	3	..
Physiology 115 .....	..	2
Optometry 401A-401B	2	2
Optometry 102A-102B	3	3
Elective	4	..
	15	15

Senior Year

	Units 1st sem.	Units 2d sem.
Optometry 101	3	..
Optometry 105A-105B	2	2
Optometry 103A-103B	3	3
Optometry 404A-404B	3	3
Optometry 406 .....	..	2
Physics 111A-111B	2	3
Elective	2	3
	15	15

For further information see separate leaflet, Curriculum in Optometry, to be obtained from the University of California Press, Berkeley.

University of Illinois

This university requires that candidates for the examination in optometry must meet the requirements for the degree of Bachelor of Science, taking their major work in the department of Physics. For a student who is preparing for the design of optical instruments, sometimes called "optical engineering," a special curriculum leading to the degree of Bachelor of Science is arranged.

CHAPTER XVI

Optometry's Post Graduate Courses

While a system of collegiate and graduate education was thus being established, optometry did not neglect provision for post-graduate instruction. This was carried out chiefly under the auspices of the American Optical Association,—later, the American Optometrical Association,—through its Scientific Section.

The Rochester convention of the Association, held in 1913, may rightly be termed the father of optometric post-graduate courses. Before the announcement of the convention the officers of the Scientific Section laid plans for what they believed would be the greatest innovation in optometric education. A pre-convention three-day course was arranged, to be held prior to the regular meeting, which was attended by a large number of optometrists. So successful was this course that the officers of the Section were asked to conduct a similar one at Boston the following winter.

Enthusiasm and interest in post-graduate work became so marked that it became necessary to add to the subjects, as well as to the personnel of the teaching staff. Accordingly a lecturing staff was created by the Section, added to from time to time, any of whom were available upon request of any of the State Societies.

In 1914 the annual convention of the Association was held in St. Louis, Mo., for which occasion the Section prepared a post-graduate program which was designed to outdo any previous effort. The educational features of this congress were in the hands of Professors A. Jay Cross, John C. Eberhart, Frederic Woll, and others, and it proved to be the most notable congress thus far held. Press comments were numerous, and filled with praise for the efforts being made to educate optometrists.

The following winter the post-graduate course was held in Detroit, Michigan, in which Ohio and Canada were invited to partici-

pate. In 1915 it was staged in San Francisco, and while the Panama-Pacific Fair was the great attraction in that year, the post-graduate course vied with it in sharing the interest and attendance of the visiting optometrists. In 1916 Providence, R. I. was the scene of the congress, and here the success of the St. Louis post-graduate course was repeated, the attendance being higher than at any other previous meeting, and more attention being given to practical work.

The World War interfered with the congress in 1917. A convention of the Association was held at Columbus, Ohio, but the Scientific Section omitted its program. Instead, a pathological clinic was held at the Ohio State University. The following year the convention was held in Minneapolis, Minn., but at this meeting the development of pending changes in the organization of the Association overshadowed the educational features.

The year 1919 saw the convention at Rochester, N. Y. again. At this congress a new constitution was adopted, which marked the passing of the Scientific Section. Under the new constitution a Department of Education was created, to which the post-graduate educational work of the organization was thereafter delegated.

Since that time, down to the present day, the Department of Education has functioned in the furtherance of educational work in general. However, with the growth and maturity of the State Societies throughout the country, these organizations have largely taken over the administration of their own post-graduate educational work. Practically every annual meeting of each State body is nowadays giving more and more time and effort to educational features; and most of the State societies, and several local ones, put on one or more purely educational meetings at intervals during the year. In addition, all the regularly constituted optometric schools and colleges in the country give excellent post-graduate courses in theoretic and practical optometry.

Public Clinics

Of recent years optometry, following in the course of medicine and dentistry, has instituted at various populous centers in the United States public clinics, at which free optometric service is

rendered to the deserving poor, or services at exceedingly moderate fees to those who are unable to pay the prevailing private-practice rates. And these clinics are made the means of instructing post-graduate students who choose to avail themselves of them.

Concerning the clinic conducted in New York City by the New York City Optometric Society, *The New York World*, in its issue of October 8, 1927, published an article which illustrates the value of this class of work from the standpoint of the public.

Eyeglasses to most persons may seem to be a far cry from religion, but to Dr. Robert J. Harrison of the Union Methodist Church and Social Centre they have a very direct connection. The practical application of goodness is his way of explaining the work that is being done in the eye clinic at the centre, located on 48th Street between Broadway and Eighth Avenue.

From the gift of a single pair of glasses to a man whose eyes were badly in need of attention, a completely equipped eye clinic has been established at the centre through the efforts of Dr. Harrison and the Optometrical Society of this city. Every Friday evening from 7 until 10 o'clock trained optometrists are in attendance to examine and fit with glasses the applicants who come recommended by any of the established charity organizations. Assisting with the patients is Mrs. Mary McVicker, sister of Mrs. Harrison.

According to Dr. Harrison this is the only clinic which supplies glasses without any charge whatsoever. Last year more than 500 pairs were given away to men, women and children. This year the aim of the clinic is to distribute 1,000 pairs to needy persons.

"Situated as we are, just off Broadway, the church centre is rather like the backwash of a great river," Dr. Harrison said. "All sorts of persons wander in here and we try to help them find their niche. You may think I am drifting far from my field when I say that it is my dream that just some such practical demonstration of Christianity as the eye clinic might be repeated by the church in every large city and small town of this country.

"Just suppose the local branches of the Optometrical Society throughout the country might co-operate with some church to help relieve the needy in that town. It would certainly be the means of preventing many failures. In our experience here with both young and older persons it is frequently a matter of sight which prevents them from getting ahead or finding the right sort of jobs. This was forcibly brought home to us in the case of the first man for whom we procured glasses. An appeal for help to J. F. Hill, President of the New York City Optometrical Society, re-

sulted in the examination of the patient, who was fitted with glasses without charge and was then able to find work."

According to Mr. Hill the clinic is the beginning of a movement by which the optometrists hope to carry their share of charity work. Leading members of the profession have donated their services, while the glasses and instruments necessary for examination have been offered by various manufacturers through the appeal made by the association in order that all the work might be done without cost to the patient.

Such work is bound to react in favor of both optometry and the public. The best advocate of any cause or policy is he who has benefited by it, and it is a safe conclusion that those people who are aided by optometry will "tell the world." It assures the public of the broadmindedness of optometry's aims and purposes. From any angle, it is a good work.

At the time that this history is being written, a large number of representative optometrists are in attendance on a meeting of the American Academy of Optometry, being held in Chicago, Ill. This body, which was inaugurated in 1912, and brought to effective organization in 1925, has been created for the purpose of furthering the purely scientific and professional interests of optometry, as distinct from its organization and publicity interests, and of raising the standards of the profession. It marks another departure in the educational development of optometry.

And finally, in January of this present year, 1928, there was announced from New England the organization of the Distinguished Service Foundation of Optometry, the primary purpose of which is to encourage research work among the optometrists throughout the country, by the annual award of gold medals and fellowships for the best research, inventive and organization work during the year. The preliminary program of the Foundation, as given out by the Board, is as follows:

The Distinguished Service Foundation of Optometry is established to encourage optometrists to engage in research work and other service for the advancement of the profession of optometry, and to recognize such endeavor with awards of gold medals and fellowships.

The first awards of medals and fellowships will be made at the annual meeting of the Foundation in 1929, which shall take place at the same time and place as the New England Council of Optometrists is held. Presentation of gold medals and fellowships will be accompanied with exercises commensurate with the importance of the occasion.

If any recipient of a gold medal or fellowship lives at too great a distance for him to come to the place of meeting of the Foundation to receive an award or fellowship, arrangements will be made with his State Association to make the presentation at a function appropriate to the event.

All contributions for the medals and fellowships must be submitted in typewriting and received by the director, on or before Jan. 1, 1929.

Gold Medals and Fellowships will be awarded as follows:

(1) For the best thesis on any subject chosen by the optometrist himself and judged to be the most scientific contribution to optometry.

(2) For the most practical counsel to be delivered to patients and others on the need of proper illumination in the home, office or factory, which will induce patients and others to make sure that their home or place of work is effectively illuminated.

FELLOWSHIPS

(1) For the most effective eye exercises which can be made part of the regular physical exercises in public schools.

(2) For the most practical and effective method of conducting eyesight saving classes in public schools.

(3) For the best eyesight conservation instruction which can be given to a patient during examination.

(4) For the most effective counsel which an optometrist can deliver while making an eye examination so as to make the patient more eye-conscious, by explaining what each stage of the examination reveals and why each instrument is used, thereby stimulating the patient's interest and cooperation in the examination. The average patient undergoes an examination without acquiring the faintest idea of what it means and reveals.

(5) For the best thesis on this question: Is the eye chart used in most optical establishments adequate, having regard to the fact that millions of persons are continually using their eyes at a range varying from twelve to twenty inches?

(6) For the simplest and most effective device which children and adults may wear to protect their eyes while setting off fireworks on July 4 or any other public holiday. This contrivance must be something which may be sold for five or ten cents and which children and adults out of sheer novelty will be eager to wear.

Recipients of medals and fellowships will automatically be elected Fellows for life of the Foundation.

GENERAL OBSERVATIONS

No attempt has been made by the Foundation to enumerate a host of subjects available for research or other work. Nor has attention been given to questions of a remote character, or of special value except, perhaps, to the investigator himself. Such matters are apt to become musty, dusty and cobwebbed in forgotten pigeonholes.

Each year, however, efforts will be made to formulate new questions and problems based upon the needs of conservation of vision and upon the exigencies of the profession as they arise.

There are men in the optical industry, and in other fields, who have rendered distinguished service to optometry. It is most gratifying to the Foundation to acknowledge the splendid cooperation of scientists connected with universities and other centers of learning in placing their special knowledge and powers at the service of optometry. This cooperation, indeed, is one of the most encouraging features in Optometry's advance toward that place of professional attainments which ultimately will win for optometry recognition by education, city, state and national authorities the world over.

Finally, it is the aim of the Distinguished Service Foundation of Optometry to represent what is highest in the world of optometric science, as the American Academy for the Advancement of Science, the British Royal Academy and the French Academy stand for the highest and best in their fields respectively.

CHAPTER XVII

Optometry's Optometric Procedure

The public, of course, is not particularly interested in the detailed technical procedures employed by any of the learned professions in the performance of their work. Technical methods are matters of special knowledge and training. It is for that very reason that the public delegates such special work to specialized groups of practitioners, and creates State boards, composed of professional men and responsible to the people, to insure qualification and to regulate practice. And it is one of the chief purposes of this history to set forth the fact that optometry occupies this specialized and legalized status.

Nevertheless, a general statement of the methods of procedure followed by scientific optometrists in the examination of eyes and the correction of oculo-refractive defects has an important place in the record of optometry's growth and development, for two reasons: (1) As demonstrating the degree of efficiency acquired and maintained by qualified optometrists in their service to the public, and their title to recognition as a profession, entrusted with the high function of safeguarding human vision. (2) As concrete evidence that the practice of optometry, embodied in its technical procedures, is not in any sense the practice of medicine, but, as claimed, an applied human-service arm of optical science.

Any description of the technic of an applied science can, of necessity, be only tentative; what our theatrical friends call "dated." For all applied sciences are in a continual state of flux. The ink is hardly dry on the description of any procedure before the procedure itself has undergone improvement, or has been supplemented, perhaps replaced, with another and superior one. Throughout the entire campaign for optometric legislation, extending over a period of some little less than thirty years, the re-

fractive methods employed by optometrists have over and over again been explained, in a general way, to legislatures and their committees, in support of the two claims above referred to, viz., the trained ability of the optometrist to perform his function, and the non-medical, sheerly optical nature of that function. The description given in the early years of the campaign would today, even after the lapse of a short twenty-five years, seem meagre and incomplete to the up-to-date practitioner, so greatly have methods and equipment advanced in the intervening time. And those of the present day will appear equally undeveloped twenty-five years from now.

However, the basic principles underlying optometric procedures remain substantially unchanged, modified only by improved methods and instruments of application. And a brief, general outline of these procedures, as they prevail in the profession today, will serve the purpose of this record.

Perhaps no better course could be followed, in this respect, than to quote from an affidavit submitted by the Secretary of the American Optometric Association at a recent hearing in support of the validity of Chapter 379 of the New York State Laws of 1928, the so-called "Glazed Goods Law." In his affidavit the Secretary set forth, in plain and vigorous language, that eyes cannot be properly fitted with glasses unless these are prescribed after a thorough examination by a qualified practitioner; and in the course of this contention, and as a part of it, he concisely outlined the procedure which, in the optometrist's practice, constitutes such an examination.

Pertinent extracts from the affidavit made by Doctor Kiekenapp are here given.

**Extracts from Affidavit of Ernest H. Kiekenapp,
Secretary of the A. O. A.**

When one experiences eye troubles, which are usually in the nature of pain in the eyes, blurred vision, photophobia (intolerance of light), conjunctivitis (inflammation of the outer membrane of the eye, such as in pink eye), hordeolum (sties), headaches in the following regions: frontal (over the eyes), temporal

(in the temples), occipital (at the base of the skull), and occasionally a vertex (on the top of the head); blepharitis (inflammation of the lid margins), an itching of the eyes, we consider them as "local symptoms."

In addition to these, there may be other symptoms, such as general nervousness, nausea, or fatigue. A person fitting glasses must understand the causes of all the foregoing symptoms, and these symptoms must be classified by an experienced practitioner into two general classes, "local" and "constitutional."

It is essential in refraction work and in fitting lenses to the human eye that the practitioner be competent and qualified, because many of the symptoms named may reveal the presence of constitutional diseases, which immediately and forthwith require the attention of a skilled physician.

Optometrist's Examination of Patients

The first step taken by the Optometrist in the examination of patients who visit his office, is that of ophthalmoscopy, wherein the retina of the eye is viewed and may reveal the presence of constitutional diseases far in advance of any other clinical tests. Such diseases, which it is highly important for the Optometrist and physician to recognize, in order to protect not only the vision of the people of the State, but to protect the people of the commonwealth against the various diseases which are manifest in the eye, are: Bright's Disease, diabetes, syphilis, arterial sclerosis (hardening of the arteries), toxic amblyopia (toxic poisoning), etc.

Again, the symptoms enumerated may reveal local trouble only, and this again is divided into two distinct classes: pathological (diseases of the eye), and refractive errors and muscular imbalances. The practitioner in his course of study is required to differentiate between a pathological condition of the eye and the abnormal functioning of an eye caused by a refractive error or muscular imbalance. By use of the ophthalmoscope the skilled Optometrist or the physician readily recognizes a pathological condition, which may reveal any of numerous diseases of the

eyes, such as glaucoma, cataract, choked disc, detachment of the retina, optic atrophy, and others too numerous to mention, all of which are highly dangerous diseases of the eye requiring treatment or surgical operation by a skilled physician and surgeon.

These types of errors can only be determined correctly by the most scientific kind of examination, comprising both subjective and objective procedure. Unlike the spectacle peddler or merchant who sells ready-made glasses, the skilled Optometrist or the physician is able to determine, with the scientific instruments now at his disposal, the minutest error of refraction.

Subjective and Objective Tests

The old purely subjective examination is obsolete today, since in subjective examination the patient virtually examines his own eyes and admittedly determines, in an unscientific way, what glasses he shall wear for the correction of an error, the nature and extent of which he admits he knows nothing about.

An objective examination, such as is made by the skilled Optometrist or the physician, does not depend upon the reading of letters on a chart, but, on the contrary, the Optometrist or the physician is able to take the most accurate measurements of the compound transparent medias of the eye. With the ophthalmometer, he is able to measure the corneal curvature in its 360 meridians of the circle; with the skiascope, he is able to determine the power of the optical medias of the eye; with the phorometer, he can determine the tonicity of the muscles; and with such instruments as the Risely prism, kratometer, and myoculator, he is able to determine the duction power of each of the six motor muscles of the eye.

In the case of the correction of presbyopia (old sight), it is necessary that he determine the near point that will give clear and comfortable vision without injury to the eye. Again, in the case of presbyopia (old sight), the importance of the correction of existing errors for distance cannot be overestimated. The skilled practitioner recognizes the fact that the "correction for distance forms the basic correction for the presbyope. **Herein**

lies a great mistake made by many people who think that they need but "magnifying glasses" for reading purposes only.

The skilled Optometrist or the physician is likewise able to determine the tonicity of motor muscles and prescribe the necessary routine ocular calisthenics for the correction of heterotropia and strabismus (crossed eyes).

Errors, as determined by the use of the scientific instruments available today, are correctible by the proper ophthalmic lenses which must necessarily be ground to prescription to neutralize the existing errors, and this must be done with the greatest of accuracy.

Multitude of Lens Combinations

In the study of physics, we learn that lenses dominate rays of light and the types of ophthalmic lenses necessarily employed to correct some of these errors are exceedingly numerous. Some of the various types used are: Positive spherical, negative spherical, prismatic, cylindrical, spherical-cylindrical, crystal, tinted, bifocal, trifocal, decentered, periscopic, toric, punktal, etc., in fact one can gain the proper perspective of the different kinds of ophthalmic lens combinations obtainable when we realize that there is said to be 3,144,072 different lens combinations available.

While errors of refraction today exist in 85 per cent of all eyes and are so numerous and of varying nature, there are four distinct and outstanding errors, namely, hyperopia, myopia, astigmatism, and presbyopia, under which classification most errors come.

Hyperopia

Hyperopia (far sight). "That condition of refraction in which the posterior principal focus of the eye lies back of the retinal plane, so that neutral light waves, instead of focussing on the retina, fall on the retina in diffusion circles of unfocussed waves. In other words, the focal length of the refracting system of the eye is greater than the entero-posterior diameter of the

eye-ball."—(Atkinson's Unabridged Oculo-Refractive Cyclopedia and Dictionary.)

This simply means that the eye cannot focus rays of light upon the retina and remain in its comparative state of rest, but on the contrary must accommodate by exertion upon the ciliary muscles of the eye, creating a greater convexity upon the crystalline lens so that a clear image upon the retina can transmit a detailed picture to the brain for interpretation. This strain of abnormal accommodation creates an excessive drain upon the nervous system, and the greatest of accuracy, obtainable only through the employment of scientific instruments by a skilled practitioner, can apply the exact corrective measure.

Myopia

Myopia (near sight). This type of error may give the sufferer no distress whatsoever except blurred vision for distance. Although often, like in the case of hyperopia, the symptoms may be identical, the corrective measures are diametrically opposite. The definition for myopia (near sight) is:

"That condition of refraction in which the posterior principal focus of the eye lies in front of the retinal plane, so that neutral light waves, instead of focussing on the retina, come to a focus before they reach it, are reversed, and fall on the retina in diffusion circles of plus waves. In other words, the focal length of the refracting system of the eye is less than the antero-posterior diameter of the eye-ball." (Atkinson's Unabridged Oculo-Refractive Cyclopedia and Dictionary.)

The above definition, reduced to more simple terms, means that rays of light focussing upon the retina with the eye in its comparative state of rest, will, without any exertion on the part of the accommodative process of the eye, focus these rays of light inside of infinity, or at some point inside of the accepted distance of 20 feet, at which point the focussing rays would theoretically cross and from that point distant objects would appear blurred and indistinct, and a myope (nearsighted person) finds himself

perfectly helpless, since the accommodative process is powerless to open this closed angle, thereby rendering the sufferer of this type of error helpless to view distant objects clearly.

Again, the scientific instruments in the hands of a skilled practitioner, employing both subjective and objective procedure, affords the only means of accurately determining the corrective measures for such existing errors.

Astigmatism

Astigmatism. This is perhaps the most commonly misused term and often alluded to by the layman as being his type of ocular error.

Astigmatism may be of two distinct forms, myopic astigmatism and hyperopic astigmatism, which means in either case that its nature is "myopic" or "hyperopic," in common terms known as "farsighted astigmatism" and "nearsighted astigmatism."

The definition of astigmatism is as follows:

"The word astigmatism literally means 'without a point.' It denotes a condition of the eye in which waves of light are not focussed at one point as in the normal eye, but at two separate focal points. This is due to the fact that the curvature of one of the refracting surfaces of the eye—usually the cornea, but sometimes the crystalline lens—instead of being spherical, is paraboloid, i.e., made up of two different spherical curves intersecting each other at right angles; and each of these curvatures has its own set of focal points, those of the most convex curvature lying more anterior than those of the least convex. Under such conditions, it is evident, a clear retinal image cannot be obtained of any object, since the two acts of foci cannot be upon the retina at the same time. Hence, astigmatism is incompatible with clear vision." (Atkinson's **Unabridged Oculo-Refractive Cyclopedia and Dictionary.**)

It might be well to illustrate shortly just how the error of astigmatism, as above defined, reveals itself to one suffering from this error, and also how the error is properly corrected.

A person suffering from astigmatism may be able to see clearly all objects containing many vertical lines; that is, the vertical lines may be clearly visible, while the horizontal lines are in varying degrees indistinct. This condition may obtain not only in rectangle meridians, but in the oblique meridians likewise. In fact, it may locate itself along any of 180 meridians of the circle.

An error of astigmatism uncorrected, therefore, ill develops the eye and causes a drain upon the nervous system in its effort to absorb existing error, which error, if not too great, can partially be absorbed through a great tax upon the nervous system; while in greater degrees, the error cannot be absorbed and so forms distorted images on the retina, which are unacceptable to the brain, and then there develops other complications requiring great skill and judgment on the part of the practitioner in order to correct them.

The correction of astigmatism requires the most exacting scientific instruments of precision in the hands of the skilled practitioner, who alone can alleviate sufferers of this very common, yet greatly misunderstood, error of refraction.

Presbyopia

Presbyopia (old sight). This is a condition that is visited upon nearly every person at the age of 45, wherein the crystalline lens of the eye undergoes a physiological change, causing the near point, or the nearest point at which the eye can focus, to recede. The definition of presbyopia is as follows:

“**Presbyopia**—literally the sight of old age. The term is used to denote that physiological state in which, by reason of the hardening of the crystalline lens, the individual is no longer able to accommodate for his convenient near point.” (Atkinson’s Unabridged **Oculo-Refractive Cyclopedia and Dictionary**.)

In presbyopia, there may be present, myopia, or astigmatism; the presbyopia will also overtake eyes otherwise perfect. In any case, it is highly important that the correction of any existing errors for distance form the basic correction of a presbyopic error. It, therefore, naturally follows that the same care and

skill is necessary in correcting presbyopia as is necessary in the correction of any other ocular error.

Accordingly, where refractive errors are found to exist in addition to presbyopia, a bifocal correction must be applied. This correction consists of a double lens, the upper portion of which corrects the existing error for distance, and the lower portion of which contains, likewise, the correction for the existing error for distance, together with the exact spherical strength added to give clear and comfortable vision at the near point of working distance.

Again, extreme skill by the practitioner is necessary to determine the exact correction of such errors, which are found only after a detailed examination by a skilled practitioner is made.

One Chance in a Thousand of Correctness in Fitting by Mail or Self-Fitting

In the foregoing pages, I have pointed out only a few of the most outstanding errors commonly found in 85 per cent of all eyes. I have outlined, in a limited way, the importance of the employment of both subjective and objective procedure under the direction of a skilled practitioner. It naturally follows, therefore, that if this conclusion is well founded, it is obviously impossible to correct errors of refraction by mail.

Out of all the symptoms of distress described, the errors of refraction enumerated, and the various types of lenses necessarily employed in the proper correction of errors, there are but two types of errors in which mail-order houses or merchants who sell ready-made glasses dare even hope to strike the "one chance in a thousand" correction of an error.

Certainly, eye distress demanding constitutional treatment, eye diseases requiring special treatment or surgical operation, errors of refraction, such as myopia (near sight), which is often progressive and requires constant observance of a skilled practitioner, and astigmatism, which obviously, because of the very nature of

the error, requires the employment of instruments of precision in the hands of a skilled practitioner, could not hope to be in the category of errors to be corrected by mail.

“Magnifying Glasses and Strain”

I have stated that in the case of hyperopia and presbyopia, the mail-order spectacle houses or merchants selling ready-made glasses can hope to strike “one chance in a thousand” correction, the reason for this being in the case of hyperopia, where the eye has a certain amount of reserve accommodation. Through action of the motor muscles, it likewise has “reserve fusion power.”

Since “positive” or “plus” lenses are required for the correction of hyperopia, a “guess” of within one-fourth of a diopter of the error of refraction would permit the employment of the “reserve power” of the eye, and a keenness of vision would be experienced. A strain is visited upon the eye which the patient may not be aware of for a period of a few weeks and sometimes even months. The keenness of vision, obtainable through this “magnifying glass” and the imperceptibility of any strain during the interim of the “trial period,” causes the patient to consider himself properly fitted, and since the patient may be “over-corrected” or “under-corrected” he is illy fitted and, as time goes on, this error may develop into complications prompting the patient to consult a scientific practitioner, only to find that his “experiment” has led him beyond a margin of safety, and the accumulated neglect has amplified the seriousness of his predicament many fold.

In the case of presbyopia, the identical situation obtains, except with the following addition: The natural hardening of the crystalline lens, which sets in at the age of 45, requires the assistance of an ophthalmic lens for work at close range. The mail-order spectacle houses, as well as the lay-spectacle peddler and merchant who sells ready-made glasses, attempt to fit the “presbyope” (far sight people) with plain “magnifying glasses” with which they presume to supplant this physiological loss of accommodation by “guess work.”

In support of the above, I quote the following:

Guesswork as to the Accommodative Power of the Eyes

“Accommodation. The power to adjust the eye to see within its far point. It takes place by contracting the ciliary muscles which encircle the lens and draws forward the choroid and hyaloid membrane, the suspensory ligaments becoming relaxed and the lens (by its own elasticity) allowed to assume a greater convexity, especially its anterior surface, thus increasing its refraction. Amplitude of Accommodation (from Landolt) as follows:

Age in years	Amplitude (dioptrés)
10.....	12.0
15.....	14.0
20.....	10.0
25.....	8.5
30.....	7.0
35.....	5.5
40.....	4.5
45.....	3.5
50.....	2.5
55.....	1.75
60.....	1.00
65.....	0.75
70.....	0.0

“This is approximately correct, but individuals differ in the amount of accommodation they possess at the same age.” (Lewis’s *Optical Dictionary and Encyclopedia*.)

Centering Glasses

One of the most highly important points in the fitting of an ophthalmic lens to the eye is that of centering. It is positively essential that the lenses be perfectly centered in front of the pupil of the eye.

Lenses not properly ground by skilled workmen may turn out to be “decentered lenses.” Lenses placed in ill-fitting frames will likewise have the effect of a “decentered lens” and this great fault

becomes a source of danger to the patient, owing to the fact that all lenses are made up of a multiple of prisms. By reason of this fact, the simplest sphere not properly centered, may create a prismatic effect harmful to the eye, since prisms should never be worn by any person unless under the strictest supervision of a scientific practitioner.

Another danger, not wholly optical though presenting some measure of a source of danger, is that of an ill-fitting frame or mounting. Ill-fitting frames or mountings often bring on chronic irritation. Avoidance of chronic irritation is the first law to be observed in the prevention of cancer. **Actual cancers from chronic irritation caused by ill-fitting spectacles or mountings are not unheard of.**

In this age of efficiency, there is no demand made upon system of "guess work" devoid of scientific procedure. We demand efficiency in our schools, government, industries and all phases of civil life.

The Need of Visual Efficiency

The visual efficiency of the school child is imperative. The child with defective vision sacrifices the pleasure and joy of keen vision. Vision positively dominates the very course of the life of the child and, in many instances in the past, it has been the making or breaking of a career. In American history we find Theodore Roosevelt to be the most outstanding example verifying the truth of that statement.

In many States today physical examination of the school child is one of the entrance requirements.

The Department of Commerce at Washington, D. C., through Mr. Hoover, has very properly alarmed the entire country with its constant appeal to endeavor to eliminate waste in industry. A great economic loss is suffered where the visual efficiency of industrial employees is below par. As an individual, the worker, indeed, sacrifices happiness and loss of his production capacity; and, likewise, the prevalence of the foregoing condition constitutes a

huge loss to the industry and accounts for a measure of economic waste in industry.

Further, the most outstanding evidence of the need of visual efficiency can be found in the great number of motor drivers whose visual acuity is so low that they constitute a source of danger to themselves, other motorists, and pedestrians, causing a great loss of life and limb, injury and damage to property.

The foregoing clearly demonstrates the absolute necessity of eye examination by skilled practitioners and the elimination of the "guess work" necessarily employed in fitting glasses by mail, or through lay-agents, or merchants who sell ready-made spectacles.

I wish to impress upon this Honorable Court the fact that the skilled practitioner must comply with certain minimum requirements prescribed by law, violation of which places his license in jeopardy, making him, in some instances, guilty of misdemeanor and even gross misdemeanor, which situation affords the public ample recourse in case of malpractice.

The mail-order concern, the eyeglass peddler, or the merchant selling ready-made glasses over his counter, on the other hand, right from the start limits its or his responsibility to a "money back" guarantee only, which the skilled practitioner complying with all of the prescribed legal and ethical requirements could not even hope to do. Again, the inconsistency is quite apparent.

I cannot conceive of a single instance wherein, by mail or by the sale of ready-made glasses, the exact correction could be applied to an eye as a refractive error, and not to be termed the "wildest" kind of a guess work.

Summarizing, the methods of optometry include procedures for the investigation of (a) the visual acuity, both for distant and for near points, (b) the eye muscles, (c) the visual field, and (d) the fundus of the eye.

The Visual Acuity

Subjective tests. These are carried out by means of trial lenses and a test chart, or some mechanical equivalent, and

include the Fogging Test, the Stenopaic Slit, the Punctumeter, the Ametropometer, and the Dynamic Refractor. In this class must also be included the Cobalt Test. The findings of subjective tests are based upon what the patient sees, or can be made to see by the application of lenses.

Objective tests. This class of tests embraces ophthalmometry and retinoscopy, or, as it is latterly called, skiascopy. By means of the ophthalmometer the curvature of the cornea is determined; with the skiascope, the refraction of the eye is determined by the behavior of the light rays which emerge therefrom. Skiascopy is both static and dynamic; in the former procedure, the refraction of the eye is measured with the ciliary muscle at rest, in the latter with the muscle in contraction. The findings of objective tests do not depend upon what the patient sees or does not see, but sheerly upon the observations of the operator.

The Eye Muscles

The balance or imbalance of the eye muscles, i. e., the relation between the accommodation and convergence, is determined by some form of prism test, which may be carried out with the trial case, the Maddox Rod, the phoroptometer, or some other of the more recent devices designed for this purpose.

The Visual Field

The visual field, that is to say, the extent and efficiency with which the patient is able to see in all directions, is explored by means of the perimeter or campimeter, and accurately recorded on a working chart.

The Ocular Fundus

The condition of the eye-ground itself, i. e., the retinal surface at the back of the eye, with its blood vessels, nerve head, etc., is investigated by means of the ophthalmoscope. While it is not a part of the optometrist's business to diagnose diseased conditions, it is a part of his function to know what constitutes a normal

eye-ground, and to recognize it when he sees it under the ophthalmoscope, and in this way to recognize also when an abnormal condition is present which may be interfering with vision, and refer it to a medical oculist,

CHAPTER XVIII

Optometry's Organizations

Optometry's remarkable progress in the past twenty-five years has been primarily due to the banding together of public spirited practitioners into local and State societies, and the affiliation of these with a national organization. The legislative enactment of optometry laws, together with the splendid advancement along educational lines, has been the result of cooperative effort among those vitally concerned. Such cooperation and organization, when intelligently and legitimately exercised, is bound to produce reform, both within and without the profession; without it, no progress is possible.

Indeed, it may be said at once that the man who opposes himself to the spirit of organization in any department of the world's work is setting his face against the irresistible march of events. For the principle of organization is one of the chief factors in, if it is not synonymous with, civilization and progress; and no sane man wishes to be found arrayed against the cosmic procession.

If any proof were needed of the overwhelming advancement of organization what could more forcibly testify to it than the facts and figures of optometric organization in the last thirty years? When one looks back over this comparatively short period, and recalls the few occasional meetings of small numbers of optometrists, the latent feeling of jealousy and distrust toward the man in the same line of endeavor, (until by contact he found that the other fellow was not such a bad sort after all), and compares it with the close-knit solidarity of the profession today, with its resultant benefits to mankind, one is impelled to ask, Who would be foolish enough, even if he could, to stem the tide of organization in the face of such a showing?

Does not the situation demonstrate beyond question the bene-

ficial results of organization in the way of improved financial and educational conditions, a better understanding between individual optometrists, an elevation of the grade of men entering the profession, and of the work done, the furtherance of the cause of eye conservation, and in countless other worth-while respects?

Broadly speaking, organization has in view three distinct and characteristic objects:

(1) The concentration and joint advancement of those interests which are common to the individuals who organize, by which means such interests are invested with the weight and impetus of the mass, as compared to the ineffectiveness of dissipated units.

(2) The intelligent aggregation and direction of those forces which are possessed by the various individuals in more or less specialized degree, so that each may be most economically and effectively applied and most perfectly developed,—commonly known as division of labor.

(3) The interchange of thought and experience by which all of the purposes in Nos. 1 and 2 may be more and more intelligently and effectively carried out.

In any or all of these respects, organization has two distinct aspects,—its influence upon the profession itself and upon the public at large. The common interests of the profession, happily, are as a rule beneficial to themselves and the public alike; but it is to be remembered that what is **apparently** advantageous to the profession may be contrary to the public interests. It is this which makes the exercise of organization, even within the legitimate scope of its province, a serious and critical undertaking, only to be safely carried on in the full light of publicity, under the influence of scrupulous honesty within and of wholesome criticism from without.

To pretend that organized optometry has been free from mistakes would be to assume that it was made up of other than human beings. But it has been singularly free from those arrogations of function to which organization has no right,—the crushing of in-

dividual enterprise, the substitution of authority for merit, and the creation of bureaucratic systems,—which so frequently vitiate organized bodies. The great rank and file of optometrists, as represented by organized optometry throughout the country, are sound and sane; and their corporate influence has been used for the furtherance of the legitimate and praiseworthy ends of organization, resulting in ever increasing benefit to human vision.

The history of optometric organization, in its national phase, falls into two periods: The first extending from 1898, when the first American Optical Association was organized, to 1919, when this body was discontinued under its then title and charter. The second, from 1919, when the American Optometric Association was organized, under a new charter, down to the present time.

During the early days of optometry's struggles, legislative and otherwise, the educational work of the association was carried on by an Educational Committee, and the publicity campaigns from the office of the National Secretary. In 1913, at the Rochester convention, the Scientific Section was recreated, to which were delegated all educational activities. With the entire reorganization of the association at the second Rochester congress, in 1919, under the new constitution and the new name of the American Optometric Association, the Scientific Section went out of existence with its parent body, and the Department of Education took its place.

The constitution of the national organization has undergone four important changes, amounting to cancellation and replacement: once at the Rochester convention in 1913; once at the Rochester meeting in 1919; once later (known as the Ohio Charter); and last at the San Francisco convention in 1926, when the present constitution was adopted.

At the present time optometric organization is worked out cooperatively through an interlocking system of local and state societies, and a national body, of which all members of optometric associations in North America are members. The present American Optometric Association operates under a representative constitution, similar in principle and construction to the constitution of the United States. It is officered by a President, a First and

Second Vice President, a Treasurer, and a Secretary, all of whom are elected by ballot, and its corporate responsibilities are vested in a Board of Trustees, seven in number, also elected.

The officers, together with two Trustees, constitute the Board of Directors, by whom the executive activities of the Association are exercised in the intervals between annual meetings. The Directors and their associates are in charge of special departments,—the Department of Public Information, the Department of Education, the Department of Truth in Print, and the Bureau of Research; there is also a Bureau of Statistics in the office of the National Secretary.

Following is a schedule of the annual conventions, and presidents of the national organizations:

CONVENTIONS AND PRESIDENTS OF THE AMERICAN OPTOMETRIC ASSOCIATION

Year.	Place of Meeting.	Name of President Elected.
1st	1898 New York, N. Y.	Charles Lembke, New York.
2nd	1899 Rochester, N. Y.	Charles Lembke, New York.
3rd	1900 Detroit, Mich.	A. J. Cross, New York.
4th	1901 Chicago, Ill.	A. J. Cross, New York.
5th	1902 Boston, Mass.	John H. Ellis, South Bend, Ind.
6th	1903 Atlantic City, N. J.	J. C. Eberhardt, Dayton, Ohio.
7th	1904 Milwaukee, Wis.	H. P. Holmes, Des Moines, Iowa.
8th	1905 Minneapolis, Minn.	B. B. Clark, Rochester, N. Y.
9th	1906 Rochester, N. Y.	Briggs S. Palmer, Boston, Mass.
10th	1907 Kansas City, Mo.	Briggs S. Palmer, Boston, Mass.
11th	1908 Philadelphia, Pa.	John H. Cook, Knoxville, Tenn.
12th	1909 Atlanta, Ga.	John H. Cook, Knoxville, Tenn.
13th	1910 Cedar Point, Ohio.	C. N. McDonnell, Columbus, Ohio.
14th	1911 Salt Lake City, Utah.	George L. Schneider, Berkeley, Calif.
15th	1912 Chicago, Ill.	George L. Schneider, Berkeley, Calif.
16th	1913 Rochester, N. Y.	Albert Myer, Albert Lea, Minn.
17th	1914 St. Louis, Mo.	Albert Myer, Albert Lea, Minn.
18th	1915 San Francisco, Calif.	Frank J. Alexander, Salt Lake City, Utah.
19th	1916 Providence, R. I.	Frank J. Alexander, Salt Lake City, Utah.
20th	1917 Columbus, Ohio.	William T. McConnell, Pittsburgh, Pa.
21st	1918 St. Paul, Minn.	R. C. Augustine, Decatur, Ill.
22nd	1919 Rochester, N. Y.	R. C. Augustine, Decatur, Ill.
23rd	1920 St. Louis, Mo.	R. C. Augustine, Decatur, Ill.
24th	1921 New York, N. Y.	Oliver Abel, St. Louis, Mo.
25th	1922 Indianapolis, Ind.	William S. Todd, Hartford, Conn.
26th	1923 Chicago, Ill.	Thomas H. Martin, Pittsburgh, Pa.
27th	1924 Kansas City, Mo.	Thomas H. Martin, Pittsburgh, Pa.
28th	1925 Louisville, Ky.	Walter F. Kimball, St. Joseph, Mo.
29th	1926 San Francisco, Cal.	Walter F. Kimball, St. Joseph, Mo.
30th	1927 Washington	Leo Mayer, New York, N. Y.
31st	1928 Grand Rapids, Mich.	George S. Houghton, Boston, Mass.

The activities of the American Optical Association in behalf of optometry and the public need no further special mention here. They are to be found in the story of optometry's rise and progress recounted in other chapters of this history. The assistance rendered in the efforts to secure optometric laws throughout the

country; the work of the Educational Committee in supplying lecturers, and later of the Scientific Section in planning and carrying out educational campaigns and conducting post-graduate courses; the defeat of the proposed spectacle concession at the Panama-Pacific exposition; these, and other achievements of organized optometry, have already been told at length.

Publicity and educational literature was issued at frequent intervals, and judiciously distributed, reaching into millions of copies, winning thousands of friends to the cause of optometry and enlightening the people as to its nature and aims. The sale of glasses by ten-cent stores and mail order houses was exposed and discredited, if not to the point of extinction, at least to the point of popular discredit. And a hundred-and-one other activities were carried on, of far-reaching benefit to the public, to say nothing of building up solidarity and efficiency within the profession.

Since the re-organization of the American Optical Association into the American Optometric Association, which took place at the Rochester convention, in 1919, the educational work of the Association has been carried on with great efficiency by the Department of Education which was then created. The aims of this campaign have been to educate the public:

To the point where they will insist upon the examination of the eyes of every school child.

To the place where they can differentiate between fake eye specialists and legitimate, qualified practitioners.

To an appreciation of a thorough routine optometric examination of the eyes.

To a realization that eye care should be a matter of prime consideration, and that the eyes should be examined periodically.

Of these aims, none could be more important than that of providing for the examination of the eyes of school children, thus enabling them to procure correction of eye defects of which they are not aware, and lessening the toll of effort and frequent failure taken of those who endeavor to gain an education under the handicap of such defects. Such an examination, also, shows in the fertile field of youth the seed of the message of optometry, educat-

ing them to an appreciation of the value of a thorough optometric examination of the eyes.

Of late years this campaign of public education has been extended to the medium of the public press. Hardly a week goes by but the newspapers and magazines in every section of the country contain some news item, or story, or article, which enlightens the public concerning the meaning and purposes of optometry, and the importance of eye conservation. So quietly does this rising tide of publicity make its way that it almost gives the impression that, like Topsy, it "just growed." But of course it did not. Its systematic effectiveness is the result of the intelligent, guiding hand of the American Optometric Association. This body is on the job, intelligently and efficiently. Its far-flung battle line is spreading the gospel of optometry far and wide, in a well-organized and telling crusade of real publicity.

During the week of April 22, 1928, there was carried out, under the auspices of the National Optometric Publicity Campaign Committee, with the cooperation of State and local societies, a nation-wide "Save Your Vision Week," for the purposes of making the public eye-conscious. The spirit which motivated this undertaking was well voiced in an editorial by the Optometric Weekly, in its issue of March 29:

"Being and beyond the self-interest of every profession," said this journal, "is the ideal of ministering to human needs, without which it has no reason for existence and no field for work. It is no small part of optometry's task to spread the gospel of this human need and its ministration. Unless it be effectively spread, optometry itself must perish from the earth, all its high aims annulled, and made of no force or effect. 'Save Your Vision Week' is a concerted and intensive effort to do this very thing."

"Save Your Vision Week" has now passed into history. The response and cooperation surpassed anything that had been anticipated. From Maine to California, from Canada to the Gulf, every State and local organization, every individual optometrist, and every optical manufacturer and jobber, did their part. In a hundred ingenious and effective ways optometry, throughout the length and breadth of the land, the nation was, so to speak, held up

before their own eyes, and made eye conscious. It was an achievement of which the Publicity Department of the American Optometric Association might well be proud. It was a crusade of public enlightenment commensurate with the size and importance of the subject.

This national undertaking has passed into history, but not out of history. It makes only the beginning. From now on, it is the purpose of the Association that every year will see a repetition of "Save Your Vision Week,"—bigger and better each year.

In short, every resource of the organization has been, and will continue to be used in an endeavor to create a public consciousness of the service which optometry offers for the health, comfort and efficiency of mankind, and that activity will never cease, or even be permitted to diminish, until the public opinion is stimulated to the point where it will associate optometry with the care and conservation of vision. Something of what is to be expected in the future in this direction may be gathered from the program outlined by the Department of Education and Publicity in its report at the 1928 annual convention:

"Literature."—The continued distribution of the literature for publicity purposes now included in the inventory of the department as well as the revision of such numbers as may require the same and the issuing of new material as the occasion demands. Numerous suggestions have been received from all sections of the country, suggested titles for new leaflets some of which are apparently urgently needed in order to round out the scope of the material distributed by the department.

"Send the Whole Child to School Campaign."—A new feature in optometric publicity to be inaugurated during the month of August and designed to focus attention on the need of an optometric eye examination for every pupil in every school in North America. This campaign to be arranged to assist the individual member of the profession to receive the greatest amount of individual publicity as well as definitely in an additional manner identifying him with the national publicity.

"Save Your Vision Week."—A second annual campaign to be held during February, 1929, to be conducted along the same lines as the one conducted in April of this year being, however, considerably augmented by methods suggested by the experiences of the first campaign as well

as suggestions received from many who actively participated in the work.

"Syndicated Publicity."—The continuation of increased national syndicated publicity is most earnestly recommended. The results of this year alone would be sufficient to recommend its continuation, but the anticipations of next year, when it will not be an activity in virgin field, but benefit both by the experience of the past year as well as the ground work done during that period, makes its continuation essential to successful optometric publicity.

"Releases for Individuals."—A new service to consist of a prepared release each month for those members of the association who care to use it is recommended. In the conduct of this service the department would solicit articles from optometrists of national reputation which after editing would be duplicated and sent out (one each month) to members of the A. O. A. who had sent in requests for them. These articles would be intended for release by the individual to the newspaper in his community."

Republics are proverbially forgetful of those who serve them, and so, we suspect, are professions and their public. The American people go complacently about their pursuit of happiness, secure in the rights of free citizenship, with hardly a thought of the men who won those rights for them through blood and fire. By the same token it is a question whether optometry and the public actually realizes what was achieved for them in establishing optometry upon a safe legal foundation, whence it could build upward in peace and security.

Some of us well remember those years of legislative struggle. They are still fresh in our minds. Every State had its quota of unselfish leaders, who bore the heat and burden of the day. They labored incessantly, with no incentive or reward except the inspiration of their task ; they endured discouragements and defeats ; but with herculean courage they returned again and again to the attack, resolved that government of the people, by the people, and for the people, should prevail in optometry, and set it forever upon a sure foundation, secure from molestation. And they won for it the legal status it now enjoys.

Some of these men have passed away and been replaced by others. Some are still active. But, wherever they are, they were the pioneers, the Joshuas who led optometry into the Promised

Land of legalized security. No longer is it necessary to lay the bricks of optometry with a trowel in one hand and sword in the other. Surely the men who achieved this incalculable boon for optometry and the people are worthy of high honor and esteem,—far more than we are in the habit of paying them.

The great need for cooperation is self-evident to every right-thinking optometrist. The importance to himself of being an accredited member of his local, State and national organization, and of being known as such in his own community, can hardly be over-estimated. His affiliation with these bodies should not only be first proof of the optometrist's ability and integrity, but an assurance that he cooperates with his associates in all of the forward movements of his profession. This professional spirit of "what is best for one is best for all" is vitally essential for the upward progress of scientific optometry, which results in increasing value of the profession to humanity, and in the greater and greater conservation of human vision.

In conclusion, the outworking of the legalized professions was best summarized by Hon. Chas. E. Hughes, while Governor of the State of New York, a year after he had, by his official signature, legalized the practice of optometry in that State. At the convention banquet of the New York State Optometric Society, held at the Ten Eyck Hotel, Albany, N. Y., in June 1909, Governor Hughes was the guest of honor, and outlined to his hearers what he believed to be their future professional duties to the public under the newly enacted New York Optometry Law. What he then said has since been aptly termed "The Hughes Way" and might well be made the rule of conduct of all professions. Said he:

"Now, laws do not regulate themselves, and we must depend, in the last analysis, upon the sentiment of the men most directly concerned in all matters of law enforcement. If, in any community, the laws in connection with these activities of a professional sort are to be enforced, nothing is more to be desired than the maintenance of a proper standard among the men themselves. There is no one who can instruct the physician, the optometrist, or the lawyer better than the bodies of these men themselves. They are their own best instructors. It is in the healthy sentiment and practice of the practitioner that we secure the necessary safeguards and reliefs of every kind."

In the old days quackery in every profession flourished largely. There were no legal restrictions. All of us who are past middle age remember the slick, well-fed faker who came into town periodically, with a team and wagon, often bringing in his train a one-ring circus or a vaudeville show. Under a flaring torch-light the "doctor" made a humorous and eloquent harangue, and passed out electric belts or bottles of Indian tonic, worth five dollars apiece, at fifty cents. And optometry had its "eye specialist" who quartered himself at the town hotel, advertised flamboyantly in the local newspapers, and sold his cheap spectacles at exorbitant prices to unsophisticated victims all over the country-side.

That kind of quackery has gone out of fashion. Legislation and police regulation have forced it to "move on." But quackery itself never moves on; probably never will, as long as human nature remains credulous. It has shifted its base. Modern quackery plies its trade in more insidious and plausible forms, in the guise of specious professionalism, mail order glasses, and what-not.

Happily, the splendid scientific cooperation of the modern manufacturer and dealer helps to throw a safeguard about the profession and the public. Reputable houses do not lend themselves to the distribution of any but proven and reliable apparatus and lenses to the profession. But the real safety must and does lie in the intelligence and common sense of the profession itself, exercised through its organized activities. And this has always been, and still remains, one of the important tasks of organized optometry.

CHAPTER XIX

Optometry's Victory Against Exposition Spectacle Selling Concessions

In the year 1915 there was held, in San Francisco, California, the now historic Panama-Pacific Exposition. It was, as everyone will recall, more than a national, an international undertaking, designed to body forth the social and industrial and scientific progress, not only of this country, but of all the countries of Central and South America and the Pacific. Its attendance was expected to run, and did run, into the millions, drawn from the families and homes of all these countries, and its influence was at least as wide as the hemisphere.

As a part of the plans for this gigantic Exposition, which were begun as early as 1911, it was proposed to grant a concession for the fitting and selling of spectacles and eyeglasses. Similar concessions had been granted and operated at the World's Fair held in Chicago in 1893, at the Pan-American Exposition in Buffalo in 1900, and at the St. Louis Fair in 1904, all of which had been characterized by scandals of a pitiful character. The concession owners are said to have reaped a golden harvest at the public's expense; persons were sold glasses who did not need them, and others, who were in need of professional treatment, were sold glasses which did them more harm than good. It looked as though all these fraudulent operations were to be repeated, on a still larger scale, in the Panama-Pacific Exposition. And at best such an enterprise could only serve to debase and commercialize what was properly a scientific, professional service, and work detriment of the public health and eyesight.

At the time of the holding of the three previous expositions there had been no organized or legalized profession of Optometry; and medicine, apparently, had not considered itself charged with the responsibility of preventing, or even protesting against, such a debauchment of public health interests. But in 1913 optometry was well organized, and in many States of the Union had already been recognized by law, and its public status definitely established. The people were no longer without an alert and responsible champion of their interests in relation to the conservation of vision.

No sooner was intelligence received of the intention of the Bureau of Concessions than the American Optical Association, in its annual convention at Salt Lake City, Utah, in August 1911, adopted and published the following resolution:

WHEREAS, the managers of all international expositions held in the United States have shown a desire to realize all possible financial returns in order to meet heavy expenses involved, and have granted, for an enormous consideration, the concession of selling glasses during such expositions, and

WHEREAS, the methods of those obtaining such privilege in the past have always been such as to leave a trail of most gigantic trickery, and swindling people who attend these expositions, and have frequently inflicted permanent personal injuries upon them in addition to their financial losses, and

WHEREAS, the legal practitioners of optometry throughout the United States are impelled with a desire of doing good and benefiting the public,

RESOLVED, that we, the representatives of the American Optical Association, in convention assembled at Salt Lake City, Utah, this 11th day of August, 1911, hereby most earnestly protest against the granting of any such concession at the coming Panama Exposition, to be held in San Francisco, California, and urge all fair-minded men and women interested in the cause of Optometry to join with us in petitioning the directors of the San Francisco Exposition not to grant any such concession.

The resolution was followed by prompt and energetic action on the part of the Association, through its president and secretary, and its associated State Societies. A copy of the resolution was transmitted to the chairman of the Bureau of Con-

cessions and to the Manager of the Exposition, together with vigorous representations on the subject. The interests involved on the side of the Exposition were tremendous. The concession was valued at \$150,000, with commissions; and the value to the concession-holder may be estimated from this purchase figure. But the American Optical Association believed that there were counter-interests on the side of right and humanity which were priceless; and they had unshaken confidence that these would prevail.

A powerful ally was found in the public press, to whom the situation was explained. Early in the crusade Collier's Weekly printed the following stirring editorial:

Shortsightedness

"Is the Panama-Pacific Exposition of 1915 going to taint itself at the outset by an alliance with quackery? Thus it would appear from the announced purpose of the management to offer over the counter the spectacle-selling concession of the enterprise. Protests from the American Optical Association, the American Civic Association, and a number of other sources, on the ground that such procedure would be prejudicial to the eyesight of the public, have thus far made no impression upon the guiding spirits of the function as compared with the \$60,000 or so to be gained. Franklin Burt, Director of Concessions, thus reassures one of the protestants: 'I am quite sure that the policy of the exposition as to the protection of their (sic) guests are (sic) thoroughly consistent;' and President C. C. Moore writes 'that if an official concession is granted at the exposition, it will only be to some business firm of high standing.' High business standing, doubtless. But of what professional standing or skill? Do these two officials hold that protection of their guests' vision is a negligible consideration? Glasses fitted on purely concessionary and business principles may well ruin any eyesight. As Secretary Myer of the Minnesota Optometrists' Association points out, the managers, on their own showing

"take a purely commercial view of the transaction and utterly ignore the fact that better vision is not merely a matter of barter, but of professional skill and service. . . . They state that every care will be taken to fully safeguard the public interest—a promise that has frequently been made before—but the history of all former spectacle-selling concessions has shown that such promises are not and cannot be carried out."

"Obviously, to adopt the method of selling this permit to the highest bidder is to invite quackery. Would not Messrs. Moore and Burt do well to consult some specialist on moral and ethical strabismus before committing themselves beyond recall in this matter? Impaired vision for thousands of guests would be a dire aftermath to their fine enterprise."

In its issue of November 24, 1912, the Rochester Democrat and Chronicle, of Rochester, N. Y., under the title of "A Concession of Doubtful Propriety," said editorially:

"Members of the optical profession throughout the country are considerably agitated over a report that \$60,000 has been offered for the exclusive privilege of selling eyeglasses and spectacles at the Panama Pacific International Exposition, to be held in California in 1915, and by the further statement that those who desire to purchase the concession stand ready to pay \$100,000 if necessary.

"Some weird tales are told of extortions practiced at former expositions in selling this line of goods. Conventions of the American Optical Association and many state optical societies have already passed resolutions of protest against the granting of such a concession and although the argument might be advanced that such resolutions have behind them a selfish purpose, yet those who are conversant with the rapid advance in the optical profession know that the impulse behind such resolutions is the same as that which has operated to bring about the enactment of statutory regulation of the practice of optometry (fitting of glasses) in twenty-seven states and three Canadian provinces. These regulations compel a higher standard of proficiency as well as eliminate much fraudulent practice.

"The claim is made—and it seems reasonable—that no concern could afford to pay so large a price for the concession, if it intended to sell honest goods at honest prices. Apparently the purpose is to secure a monopoly with the object of hypnotizing unwary visitors, playing upon their credulity, and selling them glasses at exorbitant prices. It is said that this charge is warranted by the history of similar enterprises in the past. Many public-spirited men and women outside of the optical profession who are deeply interested in the conservation of vision are closely watching to see what action the exposition managers will take in the matter.

"An attitude of caution on the part of the managers is to be strongly urged, to the end that visitors may not be subjected to what has been described as a gigantic swindle."

For more than two years the American Optical Association, loyally backed by the entire optometric profession, the optometric press, and the public press, persevered in its determined effort to prevent what it conceived to be the betrayal of the public interest in this unjustifiable concession, leaving

no stone unturned to bring pressure upon the exposition officials to convince them of the falseness of their position. But few outside of their own circle will ever know what a task it was for these officials to meet all the arguments for and against the concession, or the great amount of their valuable time (without pay) they spent in giving proper consideration to the subject. Naturally, the exposition officials had some reason to believe that it would be possible for them to conduct such a concession honestly, because it had long been decided that the strictest rules were to be enforced in the entire conduct of the exposition, and they further figured that in optometry they would have the assistance of the strongest optometry law in the land at that time.

Optometry, however, saw the matter differently. It knew that the greatest handicap to the uplift of eye-service had ever been the prevailing impression in the public mind, justified by former chaotic conditions, that this whole eye-glass business was a graft; and although more and more every year the people were steadily having this idea of quackery removed from their minds, thanks to the organization and work of the optometric profession, yet the glaring frauds of the previous expositions were still raw in the memory of their victims and of the public, and another enterprise of the kind in connection with the coming exposition could but degrade the profession and weaken the public confidence still further.

Demands for fair management and legitimate procedure are easily made, in such cases, but not so easily enforced. Similar demands had been made at the St. Louis exposition, and lived up to by the concession-holders for a few weeks, after which they were deliberately forgotten, and expedients devised for preventing complaints from reaching the managers of the exposition. Notwithstanding that at each successive exposition the management had been more insistent on legitimate procedure in this concession, yet they continually raised the price of the concession; and in the case of the Panama-Pacific Exposition every possible effort was being used to secure several bidders against one another, so as to insure the

highest obtainable price, and, in addition, a commission was stipulated for on every dollar taken in.

It was even suggested that the concession, if granted, would be given to members of the California State Optometrical Association, who, by implication, were members of the American Optical Association. To which optometry's reply was that in such an event these persons would be disqualified for membership in either the State or the national association, since the enterprise was contrary to the spirit, the principles, and the ideals of optometry, to say nothing of being opposed to public policy.

Arguments that it could be conducted legitimately, or be made educative, were stamped as fallacious and deceptive by the Association. According to the ethics of optometry, and its obligations to humanity, the entire proposition was objectionable. Glasses cannot be furnished legitimately when forced upon the wearer. For those who feel the need of glasses, the only safe and legitimate course is to consult a reliable practitioner in their own community, or one of permanent location, in whom they have reason to confide. Wholesale, commercialized fitting and selling of glasses is a menace to the public welfare. The question of excessive charges, although an important factor, is subordinate to this higher question of human service.

The charge was not lacking, of course, that optometry's opposition was actuated by selfish motives, and even the splendid efforts of the California leaders were distorted into an attempt to secure the concession for their own ends. The conclusive answer to this charge lay in the fact that the opposition to the concession did not originate in the West at all, but in the East, in the headquarters of the National Association, the Californians being brought into it by reason of their being on the ground, where they could best aid the crusade.

Toward the end of the year 1913 Collier's Weekly printed another trenchant editorial, which is here reproduced as an indication of the vigorous support rendered by this public-spirited magazine:

Eyes At Auction

"How much is your sight worth to you? Doubtless an incalculable sum. In that case, and if you are going to the Panama-Pacific Exposition of 1915 in San Francisco, you will do well to steer clear of the official vision tinkers. For the directors of the exposition have, in a sense, put your eyes up at auction. They plan to dispose of the spectacle-selling concession at the exposition to the highest bidder, in spite of repeated protests that thus they 'take a purely commercial view of the transaction and utterly ignore the fact that better vision is not merely a matter of barter, but of professional skill and service,' to quote the president of the American Optical Association. When, in August, Collier's criticized this attitude, the director of the Division of Exploitation telegraphed a protest, offering to submit contracts and correspondence in defense of the project. By return mail we requested that the evidence be sent. No further word has been received, although six weeks have passed, up to the time of this writing. Evidently, then, the directors are going ahead without regard to the eyesight of the public, to make what profit there is in it. But why stop at eyes? Is there no golden opportunity in the dental privilege? Surely some Painless Parkins ought to 'come across' roundly for the exclusive graft in tooth pulling. What about lungs? Duffy's Malt Whiskey ought to put up a thumping price for the consumption concession. And there could not but be a pretty penny in the Bright's-disease-and-diabetes privilege; old 'Dr.' Kilmer please write. Furthermore, Dr. Hartmann of Peruna fame is still exchanging fake promises for dollars; it should take some bidding to beat him out of the catarrh permit. And how is it that gentlemen with the keen business instincts of the San Francisco managers haven't thought of inciting a profitable rivalry between Anti-Kamnia and Orangeine for the headache rights? Obviously there is a broad and fertile field of enterprise here. With neither principles nor pride to deter them, the Panama-Pacific exploiters would get enormous returns on a sale-to-the-highest-bidder partnership with the Great American Fraud—and the public be duped!"

As an official of the American Optical Association aptly said at the time, "The only inspiration needed by the writer of such an editorial would be for to ask himself, 'Would I want my mother, my wife, or my daughter, to have her eyes examined for glasses at the Panama-Pacific Exposition?'"

In the end, right and the indomitable persistence of organized optometry prevailed. On October 10, 1913,—a memorable date,—the following telegram was dispatched by the rep-

representative of the California Society and received by the American Optical Association:

"Hurrah! Committee passed following resolution October 6th: It was moved and seconded and carried unanimously that no concession for the selling and fitting of eye glasses be granted, also that all applications now on file for the optical concession be rejected. This act proves protection of public in entire exposition. Have everybody boost and show recognition of honorable officials."

The news was immediately wired to Collier's and the other members of the public press who had so valiantly supported the protest, with the suggestion that they get behind this great international exposition which had shown itself too big for alliance with projects of a doubtful character. Collier's promptly printed the following editorial:

Honor vs. Profits

"Retraction is not always painful. In the case of the Panama-Pacific Exposition and its spectacle-selling concession, Collier's amends a recent criticism with real satisfaction. It was officially announced that this concession would go to the highest bidder. Collier's twice denounced the project as an invitation to quackery; but between the publication of our two editorials the exposition committee unanimously decided against granting any spectacle concession at all. We are sincerely sorry that the news of this good resolution did not reach us a few days sooner. But we are sincerely glad to recognize the high standards of probity which led the officials, after conscientious examination of the facts, to throw out some \$60,000 of clear profit; and we congratulate the exposition on its spirit of good faith and fair dealing. To stand to an unworthy proposition in the face of public disapproval may take brute courage. To withdraw frankly from it indicates both courage and that sense of honor without which courage is a vice."

To President Moore, of the Exposition, and to Hon. Frank Burt, director of concessions, the president of the American Optical Association telegraphed:

"Our hats are off, and the American Optical Association is back of the exposition management that proved itself big enough and proud enough to reject the spectacle concession, and definitely repudiated any partnership with projects of a doubtful nature."

To the optometric profession the president of the Association issued the following statement:

"All honor to the unselfish men who have dared to set a precedent for all future exposition managements to follow in excluding questionable enterprises regardless of revenue.

"From now on, 'Boost the exposition' must be the slogan. No boasting or exulting over the results. We simply supplied the facts which it was our business to know, and brought them to the attention of men already carrying almost superhuman burdens and mentally occupied with staggering problems,—men who are rendering a service money could not buy, and not only doing it for nothing, but at great personal sacrifice and even financial loss.

"These are the kind of men who have decided, now that the evidence is all in, that money can not buy a spectacle concession at their hands, and that nothing in the least detrimental to the welfare of the exposition's guests shall be allowed to pass through its gates. This is an urgent appeal from one who you know is speaking in all sincerity and good faith, to use your utmost efforts to make the Panama-Pacific International Exposition what it deserves to be and will be in point of attendance, as it assuredly will be greatest in every other respect, of all international expositions.

"Be governed by the example of the able, patriotic and generous managers of this colossal enterprise, and give unstintedly of your time and use your influence in every possible way to help it along. Talk about it, write about it, and get all your friends and newspapers to do likewise."

The public aspect of the crusade and its victorious denouement is voiced in the story printed in the Sunday, October 12, issue of the Rochester, N. Y., Democrat-Chronicle:

EXPOSITION HAS BARRED SWINDLE IN EYEGLASSES

Scheme Will Not be Worked in San Francisco

FIGHT STARTED HERE WON

**Managers of Panama-Pacific Exposition, Convinced that Spectacle Game
is Fraud, Reject all Applications Made for Concessions**

The fight against the granting of a concession at the Panama-Pacific Exposition in 1915 for the fitting and selling of eyeglasses, which had its inception in this city, was won last Monday, when it was announced that the Bureau of Concessions and Admittance and the Board of Managers of the exposition had unanimously voted not to grant such a concession.

An appeal to the Manager of the Bureau of Concessions and Admittance, Frank Burt, and chairman of the Board of Managers, C. M. Moore, not to grant an eyeglass concession, was made by the American Optical Association and other organizations. When these men were shown how fraudulent such an enterprise would be they unhesitatingly refused to grant it, and they rejected all applications for it on file.

At the World's Fair in Chicago, at the Pan-American in Buffalo and at the St. Louis Fair, persons having an optical concession are said to have conducted swindling operations of a pitiful character. Victims when they did not need them, it is said, and to others who were in need of optical treatment were sold glasses that did them harm rather than good.

Swindle at Other Fairs

The concession owners at all three of these fairs are said to have reaped a golden harvest—at the public's expense. Members of the American Optical Association say that at the St. Louis Fair agents working for the concession owners were able to make in commissions as much as \$100 and \$150 a day. Exorbitant prices were charged for glasses and treatment.

"Glasses cannot be furnished legitimately," said an officer of the American Optical Association, "when they are forced upon the wearer. Those who feel the need of glasses should go to someone in their own community whom they or their friends know to be reliable practitioners, and who should be permanently located where he can be found the next day, week, month or year."

In their refusal to grant an optical concession the managers of the San Francisco Exposition have sacrificed an actual profit of more than \$100,000, but the loss, it is expected, will be made up to them as a result of the faith in their exposition that the public will have. The concession privilege alone would have been sold for \$75,000, and a commission was to have been received by the exposition. It is argued that the attitude of the management in this case shows its desire to deal fairly with the general public.

Agitation Began Here

The secretary of the American Optical Association, said yesterday that the officers and members of the association throughout the country were elated by the action of the managers of the exposition.

"The Rochester members of the Optical Association," said the secretary, "feel a little pride, which I believe is justified, in this victory for optometry. It was in this city that the agitation against the granting of such a concession had its inception, and the Democrat and Chronicle was the first publication in the country to oppose the scheme. Since an editorial on it was published in the Democrat and Chronicle months ago, news-

papers throughout the country have declared against the granting of the concession, and only recently Collier's Weekly denounced it as an atrocious swindling project."

CHAPTER XX

Optometry's Motor Vision Certification

One of the most important and pressing problems in visual efficiency, from the public standpoint, is that of the eyesight of motor car drivers. It arises as the result of advancing civilization. The increasing demands upon our highways and streets by a growing population, and the development of transportation to a point not dreamed of when they were built, have brought about congestion, confusion and danger, until the yearly toll of traffic accidents has reached an appalling total. If the death and disaster that now fall upon the people from this cause throughout the year were concentrated in a single catastrophe, we should shudder at its dimensions. The loss is none the less disastrous because it is spread over time and space.

The entire responsibility cannot, to be sure, be placed upon the auto driver. His sight may be normal, and he may be in complete control of his car, but he is unable to guard against accidents when the pedestrian, because of carelessness or poor vision, walks under the wheels and is killed. Nevertheless, the vision of the driver himself must necessarily be a very great factor in the safety of automobile driving; and he, after all, is the one who is in charge of the death-menacing vehicle. We should have little respect for the intelligence or judgment of a man who gave his child a loaded revolver for a plaything; but we, as a nation, are doing practically that when we allow a man to drive an automobile on our crowded city streets and our highways without first making sure that he can see sufficiently well so that he is not a menace to the community.

Optometry, whose prime concern is to conserve vision, is naturally interested in this question, and feels some public re-

sponsibility for its solution. It has given considerable study to the subject, and done a great deal toward bringing about at least a good start in the right direction looking to its regulation.

In the fall of 1924 the New York State Optometric Society, with the concurrence of the management, instituted a survey of motorists' eyes at the New York State Fair held in Syracuse, N. Y., in September of that year. The report of that survey showed the following results:

Eyes Separately Without Glasses

V. A. Per cent	No. of Eyes	V. A. Per cent	No. of Eyes
Nil	14	60%	82
10%	68	70%	30
20%	18	80%	161
30%	26	90%	127
40%	31	100%	640
50%	51		
		Total, 1,248	

Eyes Separately With Glasses

V. A. Nil	3	V. A. 60%	20
10%	1	70%	5
20%	4	80%	55
30%	1	90%	31
40%	17	100%	122
50%	12		
		Total, 272	

Both Eyes Without Glasses

V. A. Nil	1	V. A. 60%	23
10%	18	70%	9
20%	13	80%	56
30%	11	90%	29
40%	10	100%	140
50%	13		
		Total, 624	

Both Eyes With Glasses

V. A.	V. A.
Nil	0
10%	0
20%	0
30%	0
40%	1
50%	0

Total, 136

Color—Red, 622; green, 616.

Diplopia—Single binocular vision, 617; double vision, 1.

Squint—Right, 2.

Blind—Left eye, 4.

Field—O. K., 618; poor, 6.

Without Glasses—Recommended, 549; not, 75.

With Glasses—Recommended, 123; not, 3.

Total wearing correction	136
Total without correction	488
Total number of persons examined	624
Total number of eyes examined	1,248
Total number totally blind in one eye	4
Total below 10% without glasses	14
Total below 10% with glasses	3
Total below 20% without glasses	18
Total below 20% with glasses	4
Total below 30% without glasses	26
Total below 30% with glasses	1
Total below 40% without glasses	31
Total below 40% with glasses	17
Total number 50% without glasses	51
Total number 50% with glasses	12
Total below 50% without glasses	208
Total below 50% with glasses	28
Total below normal without glasses	184

The 184 did not wear any correction.

The danger line is at 50%.

It will be seen that 208, unless they were improved by aid of correction, would be on or below the danger line. This is just $33\frac{1}{3}\%$ of the total examined.

Number of persons with V. A. below 100% = 484; without glasses, out of 624, more than $\frac{2}{3}$, or $66\frac{2}{3}\%$.

Members of the joint legislative committee on motor vehicles visited the optometric booth while the examinations were in progress. Each member of the committee submitted to the tests and observed the work done. That the committee was impressed with the work of the optometrists was evidenced by the following statement from its vice-chairman made to the representative of a local newspaper:

"We were amazed at the results of some of these tests," said Senator George R. Fearon, the vice-chairman. "We were satisfied that the methods used in the tests were perfectly fair, and hundreds were examined. During our visit to the booth we found one man with only 30 per cent vision in one eye and 20 per cent in the other, who is driving a car. He does not wear glasses. It is dangerous to have such a driver on the roads of the State."

In October of the same year a group of New York optometrists appeared before the New York State Motor Vehicle Commission, not as a body demanding legislation, but as specialists on eyesight advising the Commission that such legislation would be of benefit to the public, and requesting them to recommend it to the coming legislature; which the Commission later did. The data made available to the Commission, upon which the recommendations were based, covered a multitude of cases, and represented a large amount of time and research by optometrists, much of it without pay, and even without gratitude.

As a result of this agitation, and the legislation that followed, the State of New York, through its Motor Vehicle Bureau, cooperated with organized optometry in promoting the practice of subjecting drivers, and prospective drivers, of motor cars to a visual examination, and assuring a certain visual standard, either with or without glasses, in the interests of the public safety. The New York State Optometric Association issued cards of certification for the use of its member optometrists, showing the results of the test, the recommendation based thereon, and the standard of visual acuity for driv-

ers as set forth by the American Optometric Association. A reproduction of one of these cards appears below:

The New York State Optometric Association, Inc.

Certificate of Vision for Motor Drivers

No.

Name		
Address		
Visual Acuity without glasses: O.D.....	O.S.....	O.U.....
Visual Acuity with glasses: O.D.....	O.S.....	O.U.....
Color Perception: Red.....	Green.....	Blue.....
Field Test: Angle at Right.....	Angle at Left.....	Total Angle.....
Diplopia Test:		

RECOMMENDATION

In consideration of the above evidence it $\begin{cases} \text{is} \\ \text{is not} \end{cases}$ safe for the above named to drive a motor vehicle upon the public highway $\begin{cases} \text{without} \\ \text{with} \end{cases}$ correction

Date.....192.....

Examiner for

The N. Y. State Optometric Asso., Inc.

.....N. Y. Section

In the interest of public safety the above card will gladly be issued by any member of The New York State Optometric Asso., Inc., to any person desiring to have their vision certified.

STANDARD OF VISUAL ACUITY FOR DRIVERS OF MOTOR VEHICLES

As Set Forth By The

AMERICAN OPTOMETRIC ASSOCIATION

Visual Acuity Required: 50 per cent vision, based on the accepted standards of measuring visual acuity.

Field of Vision: A Field of Vision of 140 degrees is required even if vision is normal.

Color Perception: The seven primary colors—Red, Orange, Yellow, Green, Blue, Indigo and Violet—should be recognized. Red, Green and Blue must be quickly differentiated.

Warning Signals: To grant drivers privileges to persons with only 50 per cent vision it is necessary that the letters on warning signals comply with the following minimum requirements:

1.30 inches for 25 feet	3.91 inches for 75 feet
2.61 inches for 50 feet	5.22 inches for 100 feet

Width of cross bars on letters must be one-fifth of height of letters; lettering to be either black on white, or white on black.

Illumination: Signs should be illuminated on a basis of ten foot candles per square foot for the twenty five foot distance.

Vision Tests: All drivers of motor vehicles should have their vision certified at least once a year.

The agitation of the question was not confined to New York, of course. In other States also, organized optometry cooperated with the civic authorities in its investigation, and in the search for an effective method of solution. In October 1925, the Supervisor of the Police Bureau of Public Safety, of Detroit, Mich., (Mr. H. O. Rounds), published the following article in an optometric journal, which fairly represents the state of the matter at that time:

During the past few months there has been much agitation for a law that will make it obligatory for every person applying for a license to drive to present a certificate from some member of the profession of optometry or ophthalmology, showing that the eyes of the applicant have sufficient visual efficiency to make such person a safe driver, the opinions of those promulgating this measure being that a large per cent of accidents are caused by deficient eyesight.

If the opinions of these gentlemen have any facts backing them up, I will be in favor of such a regulation myself for the "good of the greatest number."

A mass of data has been recently supplied me, including experiences from men of highest standing in the optometric profession.

I have taken the result of their tests and endeavored to harmonize them in order to get comparable data on which to base an opinion, but I find that while the methods by which they arrive at

their conclusions may be all right for each individual's data, when taken collectively it is impossible to get a comparison.

We cannot therefore arrive at any honest conclusion on this question until all use the same standard in their tests or examinations and method of deciding visual efficiency.

I am therefore offering herewith the result of an extended investigation as to which is the method that has met with the most approval from representative men and organizations in this country, which I shall endeavor to make plain as follows:

A standard for the testing of the eyes, showing the relation between the "visual acuity" as understood by the "Snellen notation" and the visual efficiency arrived at after long tests and experimentation by Mr. Scott Sterling and Dr. A. C. Snell of Rochester, N. Y., has been adopted by the American Medical Association and the Ophthalmological Section of the American Medical Association as a basis on which future tests may be made, and after much data and experience has been accumulated the danger point may be established in connection with the operation of automobiles.

Mr. Sterling states that in so far as his judgment is concerned, not backed up by numerous tests of drivers having accidents, which must be obtained to set the point of danger, the "Snelling notation" of 20-60 would be the point of danger, which may be moved up or down after sufficient data has been accumulated.

The next to be considered will be a case where the eyes vary in "notation" and some set rule must be promulgated for figuring "general central vision," that for comparative and statistical purpose all central vision shall be computed in the same way.

Up to date different practices have been using different methods, and we have got nowhere with statistics that can be used.

Mr. Sterling again offers a solution, and this method of arriving at "general central vision" has also been approved by many prominent men in all branches, and I am offering it as a reasonable standard for such computation, *viz.*:

Multiply the "visual efficiency" of the better eye, as shown on the accompanying chart opposite the "Snellen notation," by 3, and

to this sum add the amount of "visual efficiency" on same chart opposite the Snellen notation for the poor eye, and divide the total so obtained by 4; this will give a standard for "general central vision" as per example:

The better eye shows a "notation" of 20-50.

On the chart opposite 20-50 is shown "visual efficiency" of	76.5%
Multiply 76.5% by 3, equals	229.5%
In the same way the poorer eye shows 20-100, opposite which on the chart is shown.....	48.9%

Adding 48.9 to 229.5 equals..... 278.4%

Now divide 278.4 by 4 makes the per cent of "general central vision" of 69.6, which is only .03 below the danger point agreed upon for "visual efficiency" of 20-60, which according to the chart is 69.9%.

In arriving at a standard we must not confuse acuity with vision.

If all having anything to do with the treating or correction of the eye will arbitrarily adopt this chart and method of arriving at "general coneral vision" and in their correspondence, literature and statistics will use the terms and per cents as shown hereon, in a short time statistics may be accurately compiled that will be of inestimable value to the world, and we will then quote statistics instead of opinions.

Without any "ax to grind" and with the hope that I might be of some assistance in collecting reliable facts and figures on which to base an opinion, I got in touch with the Johnston Optical Co., through the optometric association of the city.

Mr. H. D. Judd of their staff became interested in the solution of this question from an impersonal point of view, and from the scientific angle, and entirely unbiased, and a Bausch and Lomb Clason Visual Acuity Meter and a McHardy Automatic Perimeter were placed in police headquarters through the kindness of the Johnston Optical Co., and Mr. H. D. Judd was detailed to make a scientific investigation and examination of any persons who had

actually had accidents, as they came in, in response to a notice from the department.

While hundreds came in during the two weeks Mr. Judd was with us, only those were examined whose accidents would indicate that the use of the eye had a bearing on the accident, and only 100 were found in the two weeks whose eyesight had any bearing at all, and these were carefully examined, the conditions of the accident tabulated, and as far as possible a mental test was made.

The result of this examination shows that 5 out of the 100 had actually had accidents where vision was unquestionably a causative factor.

The vision of two others was below normal, but the conditions of the accidents would make it questionable as to whether the vision had anything to do with it.

This examination rather upholds the result of the society of optometrists' examinations made at the State Exposition a year ago, when 44 out of 1000 had what was termed restricted vision.

I would be the first to insist on a law to make a certificate of the condition of the eye necessary before issuing a driver's license if the per cent were large in those having accidents, but the examinations so far made does not show the necessity of this, but indicates that it would be only an added burden on the driving public.

I will be pleased to supply Mr. Judd's report in full to any one who desires same.

Relation Between Visual Acuity and Visual Efficiency
By Scott Sterling and A. C. Snell

Snellen Notation	Visual Angle in Minutes	Visual Efficiency in Per Cent	Percentage Loss of Vision
20/20.....	1	100.0	0.0
20/25.....	1.25	95.6	4.4
20/30.....	1.50	91.4	8.6
20/40.....	2	83.6	16.4

20/50.....	2.5	76.5	23.5
20/60.....	3	69.9	30.1
20/70.....	3.5	63.8	36.2
20/80.....	4	58.5	41.5
20/90.....	4.5	53.4	46.4
20/100.....	5	48.9	51.1
20/120.....	6	40.9	59.1
20/140.....	7	34.2	65.8
20/160.....	8	28.6	71.4
20/180.....	9	23.9	76.1
20/200.....	10	20.0	80.0
20/220.....	11	16.7	83.3
20/240.....	12	14.0	86.0
20/260.....	13	11.7	87.3
20/280.....	14	9.8	90.2
20/300.....	15	8.2	91.8
20/340.....	17	5.7	94.3
20/380.....	19	4.0	96.0
20/400.....	20	3.3	96.7
20/500.....	25	1.1	98.9
20/600.....	30	0.6	99.4
20/800.....	40	0.1	99.9

The visual efficiency of an eye is defined as the ratio of its resolving power to the resolving power of the normal eye.

The whole matter is still in the process of being thrashed out. As indicated by Mr. Round's article, one of the crucial factors in the problem is the satisfactory determination of a standard of visual efficiency which can be agreed upon, as fair and equitable, as a minimum requirement for motor driving.

The probability is that the legal establishment and enforcement of motor vision tests will be best brought about through the action of accident insurance companies, by the concerted adoption of a hard-and-fast rule that no automobile insurance be issued to those who cannot pass a scientifically conducted test showing average normal vision. It is hardly necessary for organized optometry to force the issue, as the public demand will soon require it. Optometry's part is to co-operate in the scientific aspects of the movement. And when that time arrives that in order to receive an automobile license

the driver must possess a certificate of adequate vision, it will logically be the optometrist's certification that will be legally accepted.

CHAPTER XXI

Optometry's Value to Humanity

By their fruits ye shall know them. The practice of optometry is now regulated by law in every State of the Union and in every province of Canada. What is the real message that this has for the public? The message is revealed in the blessings which follow when defects of vision are relieved, weak vision made strong, and the eye-sight of advancing age is kept up to the standards of youth.

Theodore Roosevelt, in his autobiography, gives an illuminating account of the dramatic change wrought in his life by the discovery of his eye-defect, and its correction by properly-fitted glasses:

"It was this summer that I got my first gun, and it puzzled me to find that my companions seemed to see things to shoot at which I could not see at all. One day they read aloud an advertisement in huge letters on a distant Bill Board, and I then realized that something was the matter, for not only was I unable to read the sign, but I could not even see the letters.

"I spoke of this to my father and soon afterwards got my first pair of spectacles, which literally opened up a new world to me. I had no idea how beautiful the world was until I got those spectacles. I had been a clumsy and awkward little boy, and while much of my clumsiness was doubtless due to general characteristics, a good deal of it was due to the fact that I could not see and yet was wholly ignorant that I was not seeing."

Think of the tremendous results to America, and to the world at large, from the salvage of this one man's eyesight, and the physical health and mental vigor that it released in his person! The experience of Theodore Roosevelt is the ex-

perience of thousands of others; and, fortunately, all may now discover their handicap in time, and reap the fruits of modern science in their improved lives.

Consider what legalized optometry has done, and is doing, for the vast body of men, women, and children, whose eyes are myopic. To them new fields of vision are opened through the ministrations of the optometrist. Until the proper, scientifically prescribed glasses are applied, the myopic's world is fogged and restricted. He does not see, as men should see, the full beauties of form, color and harmony in the created world. After the optometrist applies the proper glasses, there comes a wonderful change to the myope, who then gains to see a new world with all its marvels.

People suffering from hyperopia and astigmatism are readily relieved in these days, so that their vision is made normal, more comfortable, and free from eye-strain. Their efficiency in their daily labors as students and workers is increased. They can perform tasks which would otherwise be impossible. They can accomplish an amount of labor under which they would otherwise break down from nervous and physical exhaustion. Thousands of men and women depend upon their ability to use their eyes at close work to make a living. In many, many instances eye-strain would drive them from their occupations, were it not for the aid given them by means of the lenses applied after the optometrist has made a scientific examination of their eyes.

In the old days, many workers broke down early because of failing eye-sight and eye-strain. Men and women of middle age, because of their failing accommodation, found themselves hampered in doing close work with their eyes. In studying, writing, and numerous industrial occupations, involving the use of machinery, tools, etc., at close range, thousands of workers would lose their means of livelihood were it not for the services of the optometrist in aiding their vision and relieving eye-strain. Presbyopia is not longer a terror to be dreaded. The man of advancing age, wearing the proper

glasses, may read and write with the same ease of his younger days, and in many cases better. The woman of advancing age may attend to her sewing and household tasks with equal ease.

In every field of activity the blessings of optometry are apparent. In the home, the school, the office, the church, the workshop, the amusement halls, the beneficial influence of the optometrist's work is felt. Literature, science, and art share in this benefit. The workers in each of these lines of endeavor obtain better vision as the result of the optometrist's science, and are thus enabled to put forth greater and more successful effort.

Add to all this the fact that the proper correction of defective vision conserves nervous energy, and thus tends to prevent various nervous and physical ailments; that physical improvement often means moral and intellectual improvement; and we realize more fully the immense importance and benefit of the optometric profession to humanity.

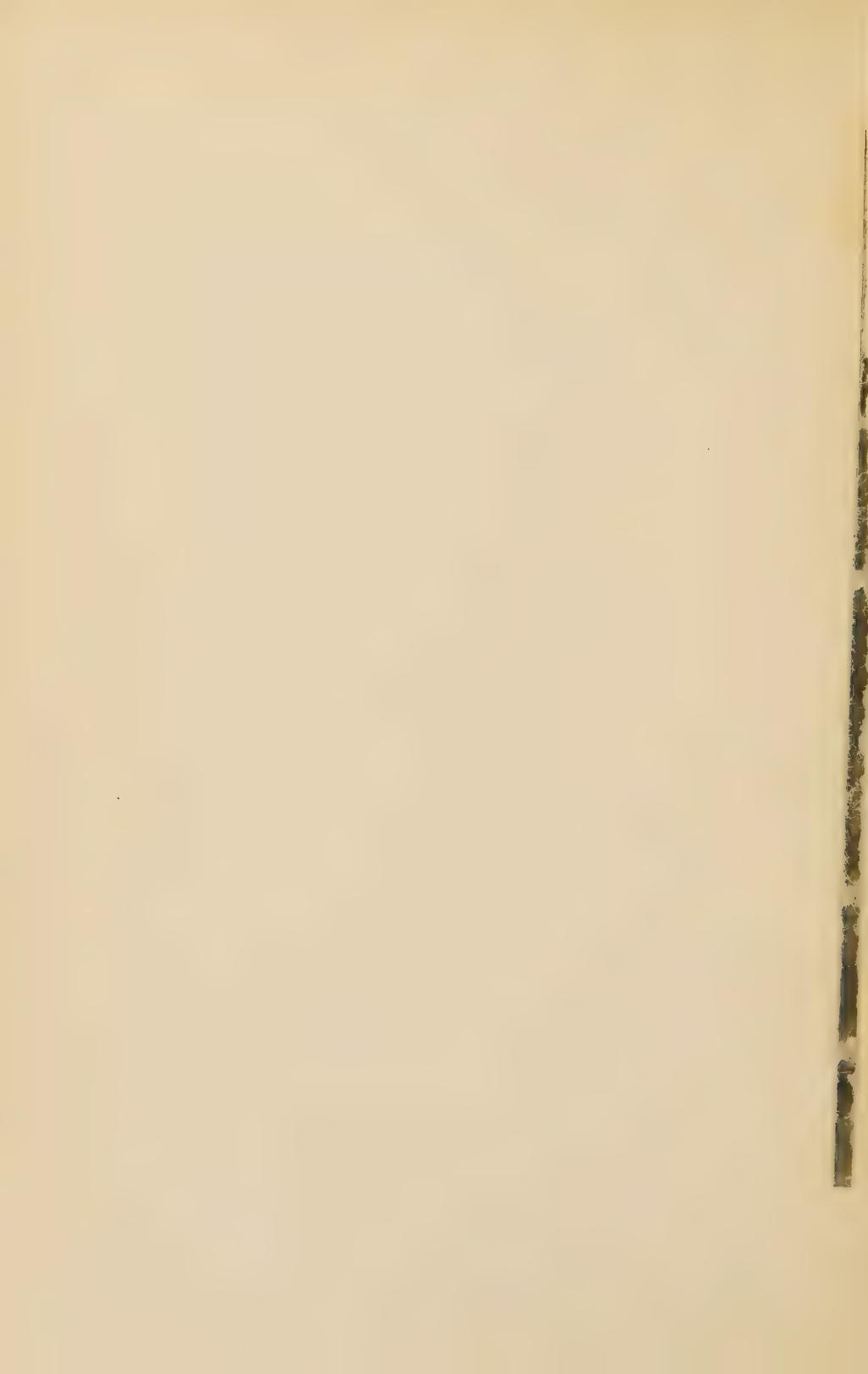
In conclusion, we quote the words of a proclamation recently issued by the Department of Public Information of the American Optometric Association:

"Never, in the history of the world, has there been such a wonderful period as the one in which we are now living. Never has there been a time when man had such a fund of knowledge at his command, or could achieve so many wonderful things.

"First, we had the stone age, when life was for the strong of arm and the fleet of foot. Then came the iron age, and, while life was more precious, still the strong lorded it over the weak. Next, the golden age, and riches took the place of strength, but the poor found little choice between the slave-driver's whip of former days and the grim lash of poverty and starvation.

"Now we have entered upon a new age, the Mental Age, when every man can be his own master, when poverty and circumstance no longer hold power, and the lowliest in the land can win a place by the side of the highest.

"This great day of opportunity is Optometry's Day. The service that optometry has to offer is not a selfish service, but one of the greatest benefit to humanity. It has been truthfully said that eighty-five per cent of all knowledge comes by way of the eye, and optometry's mission is to give better and more efficient vision to the human race. 'He profits most who serves the best.' Let it be known from coast to coast, from palm to pine, that optometry is an applied science dedicated solely and wholly to the preservation of human vision."



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